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PATENT OFFICE NOTICES

Notice of Daylight Saving Time

The Patent Office will operate on Daylight Saving Time from April 29, 1973 through October 27, 1973.

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,611,813, Sharpless and Eichert, Jr., MAGNETIC DATA STORAGE SYSTEM, **filed** Apr. 10, 1964, U.S. Court of Claims (Washington, D.C.), Doc. 99–64, *Technitrol Inc.* v. *The United States.* Order, judgment for plaintiff, Oct. 6, 1972.

2,707,985, F. C. Binnall, BAG MAKING MACHINE; **2,740,740,** same, METHOD OF MAKING BAGS, **filed** Apr. 28, 1971, D.C. Conn. (New Haven), Doc. 14372, *FMC Corporation* v. *Fischel Industries, Inc.* Default judgment of injunction, entered in favor of the plaintiff, Sept. 6, 1972.

2,729,067, R. Patterson, METHOD FOR FORMING PILES, **filed** Nov. 8, 1971, D.C., M.D. Fla. (Tampa), Doc. 71–497–C, *Intrusion Prepakt Incorporated* v. *Consolidated Soils, Inc.* Ordered dismissed without prejudice, Oct. 18, 1972.

2,740,740. (See 2,707,985.)

2,753,694, Trow and Nelson, ICE DISINTEGRATING AND CHIP DELIVERING SPIRAL ICE CHIP PRODUCING MACHINE; **3,283,529,** M. L. Nelson, AUGER ICE MAKING APPARATUS, **filed** June 10, 1968, D.C., N.D. Ill. (Chicago), Doc. 68c1057, *King-Seeley Thermos Co.* v. *Borg-Warner Corporation.* On motion of plaintiff, case dismissed with prejudice as to Patent No. 3,283,529, Mar. 31, 1970; enjoin defendant from further infringement of Patent No. 2,753,694, Oct. 13, 1972.

2,781,825, A. Lorenz, ARTICLE OF REPOSE FOR SUPPORTING THE BODY OF A PERSON; **2,918,109,** F. F. Schliephacke, ADJUSTABLE RECLINING CHAIR; **3,142,510,** P. S. Fletcher, LEG-REST ACTUATING MEANS FOR MULTIPLE POSITION RECLINING CHAIR; **3,169,035,** same, LEG-REST CONTROL ARRANGEMENT FOR RECLINING CHAIRS; **3,394,965,** same, SEQUENCING ARRANGEMENT FOR RECLINING CHAIR OF THE MULTIPLE MOVEMENT TYPE, **filed** Oct. 27, 1972, D.C., D.D. Ill. (Chicago), Doc. 72c2721, *Peter S. Fletcher* v. *Lear Siegler, Inc. et al.*

2,841,056, L. D. Hincher, PAPER EDGE FLARING MACHINE, **filed** May 18, 1972, D.C., Court of Appeals for the First Circuit, Mass. (Boston), Doc. 72–1165, *Custom Paper Products Co. et al.* v. *Atlantic Paper Box Co.* The judgment of the District Court is affirmed, Nov. 9, 1972. **Same, filed** May 19, 1972, Doc. 72–1171, *Custom Paper Products Co. et al.* v. *Atlantic Paper Box Co.* The judgment of the District Court is affirmed, Nov. 9, 1972.

2,874,409, I. T. Quarnstrom, PLASTIC MOLD BASE, **filed** Oct. 27, 1972, D.C., E.D. Mich. (Detroit), Doc. 39128, *VSI Corporation* v. *Peninsular Machinery Co. and Gulf & Western Industries, Inc.*

2,884,031, G. M. Standal, WOODWORKING, CHIPPING AND PLANING MACHINE WITH CUTTER HEAD AND CUTTER BLADES THEREFOR; **2,922,448,** same, CUTTERS FOR PLANER CHIPPER WOODWORKING MACHINES; **3,282,312,** same, CHIPPER KNIFE AND APPARATUS, **filed** Oct. 30, 1972, D.C. Oreg. (Portland), Doc. C–72–887, *Chipper Machines and Engineering Corp. and George M. Standal* v. *the Filer & Stowell Co. and Fremont Lumber Company.*

2,900,150, Hirt and Martino, EJECTION SEAT CATAPULT; **3,115,320,** G. E. Hirt, same, **filed** Oct. 11, 1972, D.C. Ariz. (Phoenix), Doc. C–72–566 PHX CAM, *Talley Industries, Inc.* v. *United States of America.*

2,918,109. (See 2,781,825.)

2,922,448. (See 2,884,031.)

2,925,719, Robbins and Linn, REFRIGERATING PACKAGE, **filed** July 7, 1971, D.C., E.D. Mo. (St. Louis), Doc. N71C32, *Hospital Marketing Services Co., Inc.* v. *Kwik-Kold, Inc.* Consent judgment, patent valid; plaintiff has infringed, Oct. 10, 1972.

2,933,833, Bredtschneider, Drewes, Laird and Onak, PIPE COUPLING, **filed** Nov. 1, 1972, D.C., N.D. Ill. (Chicago), Doc. 72c2755, *Crane Co.* v. *Aeroquip Corporation.*

2,948,524, Sweeney and Kaji, PUMP FOR MOLTEN METAL, **filed** Jan. 13, 1970, D.C., N.D. Ohio (Cleveland), Doc. C–70–31, *Carborundum Co.* v. *Metal Transfer, Inc.* Judgment is valid; plaintiff is owner; defendant has infringed. Order, defendant is enjoined; plaintiff's cause of action based on claims other than claim 4 of patent are dismissed without prejudice; defendant's counterclaims are dismissed with prejudice, Oct. 17, 1972.

2,954,621, Mosher, Goldammer and Long, ADJUSTABLE BRACELET FOR IDENTIFICATION PURPOSES; **3,059,359,** same, BRACELET FOR IDENTIFICATION PURPOSES, **filed** Nov. 3, 1972, D.C., C.D. Calif. (Los Angeles), Doc. 72–2621–CC, *M-C Industries, Inc.* v. *Precision Dynamics Corporation.*

3,057,195, Bentley and Price, FORCE MEASURING SYSTEM; **3,074,279,** H. D. Morris, POSITION DETECTING TRANSDUCER; **Re. 27,411,** Bentley and Price, FORCE MEASURING SYSTEM, **filed** Oct. 2, 1972, D.C.N.J. (Trenton), Doc. 1626–72, *Systron-Donner Corp* v. *Gulton Industries, Inc.*

3,059,359. (See 2,954,621.)

3,074,279. (See 3,057,195.)

3,088,015, Cone and Horwitt, ELECTRIC CIGAR LIGHTER; **3,433,928,** L. G. Horwitt, CIGAR LIGHTER, **filed** Oct. 30, 1972, D.C., N.D. Ill. (Chicago), Doc. 72c2733, *Casco Prod. Corp.* v. *Nissan Motor Co. et al.*

3,114,349, S. Schuman, STERILIZATION INDICATORS, **filed** Dec. 28, 1967, D.C., S.D. Ohio (Cincinnati), Doc. 6611, *Propper Manufacturing Co., Inc.* v. *Adhere Corporation.* Order, motion of defendant for partial summary judgment is granted as to claim 4, but over-ruled as to claims 9 and 10, Oct. 25, 1972.

3,115,320. (See 2,900,150.)

3,142,510. (See 2,781,825.)

3,169,035. (See 2,781,825.)

3,197,299, Stull and Morrow, PROCESS FOR SPRAY APPLICATION OF PESTICIDES, **filed** Apr. 1, 1971, D.C. Minn. (Minneapolis), Doc. 4–71–C–140, *Hercules, Inc.* v. *Minnesota State Highway Department.* Stipulation and order of dismissal, Sept. 28, 1972.

3,262,027, Zaleske and Churchill, SOLENOID STRUCTURE AND MOUNTING MEANS THEREFOR, **filed** Nov. 3, 1972, D.C., N.D. Ill. (Chicago), Doc. 72c2786, *Automatic Switch Co.* v. *Emerson Electric Co.*

3,282,312. (See 2,884,031.)

3,283,140, C. H. Rex, STREET LUMINAIRE, **filed** Oct. 20, 1972, D.C., N.D. Ohio (Cleveland), Doc. C72–1126, *General Electric Co.* v. *Westinghouse Electric Corp.*

3,283,529. (See 2,753,694.)

3,318,062, P. R. Grants, PRECAST INSULATING MASONRY UNIT AND INSULATING FILLER, **filed** June 22, 1972, D.C.N.J. (Trenton), Doc. C–1074–72, *Formbloc, Inc.* v. *Paul R. Grants, individually and I.F.S., Inc.* Notice of discontinuance filed Oct. 27, 1972.

3,344,815, Lawson and Bailey, STRAP TIGHTENING AND CUTTING TOOL, **filed** Nov. 3, 1972, D.C., N.D. Ohio (Cleveland), Doc. C72–1201, *Thomas & Betts Corporation* v. *ETC, Incorporated and International Telephone & Telegraph Corp.*

3,394,965. (See 2,781,825.)

3,405,376, Geise, Baker and Hillman, ROTARY STEPPING MECHANISM, United States Court of Claims (Washington, D.C.), Doc. 54–69, *Ledex, Inc.* v. *The United States.* Judgment entered for plaintiff, Oct. 27, 1972.

3,420,064, Blass and Blass, IRRIGATION DRIPPER UNIT AND PIPE SYSTEM; **3,604,728,** same, DRIP LEVEL IRRIGATION, **filed** Oct. 17, 1972, D.C., S.D. Calif. (San Diego), Doc. 72–436–S, *Drip Irrigation Corporation of America* v. *Controlled Water Emission Systems.*

3,425,500, B. H. Fuchs, EXPANDABLE UNDERREAMER; 3,483,834, same, UNDERREAMER HAVING UNEQUAL ARM EXTENSION RADII, filed Oct. 30, 1972, D.C., C.D. Calif. (Los Angeles), Doc. 72–2570–JWC, *Grant Oil Tool Company, Inc.* v. *Benjamin H. Fuchs and Petroleum Drilling Tools Co.*

3,483,928. (See 3,088,015.)

3,468,631, Raible, Bentley and De Wall, BLOOD OXYGENATOR WITH HEAT EXCHANGER; 3,488,158, Bentley and De Wall, BUBBLER ASSEMBLY FOR OXYGENATOR; 3,578,411, same, BUBBLER ASSEMBLY FOR BLOOD TREATING APPARATUS, filed Oct. 31, 1972, D.C., C.D. Calif. (Los Angeles), Doc. 72–2579–WMB, *Bentley Lab. Inc.* v. *William Harvey Research Corp.*

3,483,934. (See 3,425,500.)

3,487,221, L. M. Frank, LIGHT ACTIVATED TRIGGER FOR PHOTOGRAPHIC FLASH SYSTEM, filed Mar. 3, 1972, D.C., N.D. Ill. (Chicago), Doc. 72c572, *The Lase Co.* v. *Honeywell, Inc.* Order, dismissed with prejudice pursuant to stipulation, June 12, 1972.

3,488,158. (See 3,468,631.)

3,496,812, White and Heyer, PLASTIC CUTTING DEVICE AND METHOD, filed Oct. 27, 1972, D.C., M.D. Fla. (Tampa), Doc. 72–641–C, *Kenneth White* v. *Mar-Bel, Inc. and Mr. Dan Marshlack.*

3,528,866, L. D. Stevens, METHOD OF MAKING LAMINATED PADDED ARTICLE, filed Oct. 26, 1972, D.C., S.D. Fla. (Miami), Doc. 72–1699–C, *Arvin Industries, Inc.* v. *Anodyne, Inc.*

3,552,051, E. B. Ritchey, EAR TAG, filed Nov. 11, 1971, D.C. Minn. (St. Paul), Doc. 3–71–C–277, *Eugene B. Ritchey* v. *Fearing Mfg. Co., Inc.* By consent of the parties, order of dismissal, Oct. 6, 1972.

3,578,411. (See 3,468,631.)

3,590,538, J. A. Holt, PLUG CONSTRUCTION FOR USE WITH ANCHOR INSERTS SET IN CONCRETE, filed Sept. 2, 1971, D.C., N.D. Ill. (Chicago), Doc. 71c2142, *Superior Concrete Accessories* v. *Burke Concrete Accessories.* Enter order for entry of order for dismissal granted, July 13, 1972.

3,597,771, C. H. Rickmeier, Jr., BED PANS; D. 216,059, same, BED PAN, filed Oct. 5, 1972, D.C., N.D. Ill. (Chicago), Doc. 72c2498, *The Vollrath Co.* v. *Premium Plastics, Inc.*

3,604,728. (See 3,420,064.)

3,613,044, W. G. Rarick, POWER SUPPLY CORD HATCH, filed Oct. 26, 1972, D.C., N.D. Ind. (South Bend), Doc. 72–S–217, *Lyall Electric, Inc.* v. *Glenn Moore and John Moore, doing business as Handyhome Products Co.*

3,629,931, J. M. Stanley, METHOD AND APPARATUS FOR NAILING A STRUCTURAL FRAME, filed Oct. 26, 1972, D.C., N.D. Tex. (Dallas), Doc. CA–3–6428–D, *Multi-Systems, Inc.* v. *Signode Corporation et al.*

3,634,891, J. M. Kemper, SELF-CONTAINED RECIRCULATING SANITARY SYSTEM; 3,662,888, same, RECIRCULATING TOILET SYSTEM AND FILTER THEREFOR, filed Aug. 11, 1972, D.C., C.D. Calif. (Los Angeles), Doc. 72–1857–MML, *Monogram, Industries* v. *Sanco Systems International and Jade Fabrication Inc.*

3,658,833, R. S. Lucas, MEANS FOR CHLORINATING SWIMMING POOLS, filed Sept. 18, 1972, D.C., N.D. Ga. (Atlanta), Doc. 17164, *Purex Corporation, Ltd.* v. *Bio-Lab, Inc.* Judgment, enjoining and restraining defendant from infringing plaintiff's copyrights, Oct. 26, 1972.

3,662,888. (See 3,634,891.)

3,675,247, J. O. Ferrell, METHOD FOR FABRICATING PANTY HOSE; Re. 25,360, E. G. Rice, COMBINATION STOCKINGS AND PANTY, filed Aug. 3, 1972, D.C., M.D.N.C. (Greensboro), Doc. C–231–G–72, *Tights, Inc.* v. *Adams-Millis Corporation.*

3,698,427, F. Baranowski, Jr., FLUID FLOW CONTROL VALVE, filed Oct. 24, 1972, D.C. Mass. (Boston), Doc. 72–3258–LC, *Frank Baranowski, Jr.* v. *Wingaersheek Turbine Co., Inc.*

3,696,813, R. M. Wallach, CRYOSURGICAL INSTRUMENT, filed Oct. 10, 1972, D.C. Mass. (Boston), Doc. 72–3103–M, *Cryomedics, Inc.* v. *Dynatech Corporation.*

D. 216,059. (See 3,597,771.)

Re. 24,017, J. A. Henricks, COATING AND DRAWING METAL AND COMPOSITION THEREFOR, filed Oct. 30, 1972, D.C., M.D.N.C. (Winston-Salem), Doc. C–317–WS–72, *Caterpillar Tractor Co.* v. *Technograph, Inc. et al.*

Re. 25,360. (See 3,675,247.)

Re. 27,265, Ritchie and Glass, APPARATUS FOR AUTOMATICALLY COPYING LINES, filed Oct. 10, 1972, D.C. Conn. (New Haven), Doc. 15372, *The Gerber Scientific Instrument Co.* v. *Barr and Stroud Ltd. and D-Mac Limited.*

Re. 27,411. (See 3,057,195.)

Certificates of Correction for the Week of May 1, 1973

Re. 27,392	3,669,186	3,691,066	3,699,427
Re. 27,492	3,671,224	3,691,157	3,699,451
D. 225,044	3,671,347	3,691,241	3,699,727
3,328,355	3,673,167	3,691,358	3,699,881
3,497,340	3,673,943	3,691,585	3,700,671
3,504,280	3,674,643	3,691,872	3,700,721
3,505,301	3,674,766	3,691,913	3,700,982
3,530,486	3,675,089	3,692,041	3,701,081
3,530,511	3,675,440	3,692,163	3,701,151
3,537,543	3,675,461	3,692,303	3,701,188
3,539,876	3,677,326	3,692,475	3,701,350
3,541,548	3,677,721	3,692,596	3,701,424
3,542,150	3,677,902	3,692,731	3,701,824
3,550,103	3,677,976	3,692,769	3,701,847
3,559,532	3,678,242	3,693,139	3,701,976
3,563,474	3,678,668	3,693,163	3,702,080
3,579,776	3,678,763	3,693,179	3,702,081
3,580,853	3,679,632	3,693,221	3,702,108
3,585,619	3,679,658	3,693,241	3,702,158
3,586,384	3,679,747	3,693,257	3,702,272
3,591,027	3,679,756	3,693,397	3,702,324
3,597,420	3,680,378	3,693,443	3,702,595
3,616,340	3,680,534	3,693,469	3,702,655
3,616,787	3,680,786	3,693,489	3,702,740
3,619,055	3,680,930	3,693,513	3,702,838
3,619,120	3,681,088	3,693,535	3,703,112
3,619,459	3,681,139	3,693,705	3,703,219
3,619,513	3,681,353	3,693,746	3,703,233
3,619,755	3,681,671	3,693,856	3,703,240
3,620,410	3,682,223	3,693,883	3,703,337
3,623,003	3,682,280	3,693,908	3,703,402
3,624,295	3,682,539	3,693,952	3,703,423
3,624,300	3,682,712	3,694,081	3,703,495
3,625,287	3,682,910	3,694,088	3,703,526
3,625,899	3,683,309	3,694,258	3,703,572
3,626,992	3,683,475	3,694,282	3,703,589
3,627,818	3,683,477	3,694,591	3,703,759
3,628,255	3,684,081	3,694,756	3,703,918
3,628,869	3,684,868	3,694,807	3,703,948
3,632,350	3,684,892	3,695,338	3,704,182
3,632,361	3,685,325	3,695,439	3,704,208
3,632,674	3,685,355	3,696,085	3,704,269
3,632,708	3,685,636	3,696,128	3,704,318
3,634,691	3,685,654	3,696,158	3,704,361
3,635,077	3,685,658	3,696,341	3,704,451
3,641,558	3,686,013	3,696,353	3,704,511
3,642,478	3,686,114	3,696,354	3,704,672
3,642,541	3,686,155	3,696,388	3,704,695
3,642,797	3,686,248	3,696,400	3,704,714
3,642,817	3,686,491	3,696,424	3,704,775
3,643,269	3,687,080	3,696,457	3,704,865
3,648,401	3,687,269	3,696,508	3,704,872
3,650,521	3,687,303	3,696,668	3,704,949
3,651,346	3,687,829	3,696,896	3,704,956
3,652,461	3,687,996	3,696,920	3,705,046
3,653,476	3,688,117	3,697,138	3,705,086
3,653,889	3,688,259	3,697,148	3,705,096
3,654,008	3,688,311	3,697,387	3,705,247
3,654,139	3,688,407	3,697,471	3,705,318
3,656,152	3,688,409	3,697,475	3,705,486
3,656,240	3,688,441	3,697,610	3,705,500
3,658,864	3,688,759	3,697,613	3,705,806
3,660,768	3,689,146	3,697,691	3,705,911
3,661,990	3,689,194	3,697,709	3,705,978
3,662,292	3,689,258	3,697,817	3,706,066
3,662,511	3,689,570	3,697,903	3,706,094
3,662,513	3,689,926	3,698,070	3,706,239
3,663,246	3,690,045	3,698,231	3,706,350
3,663,507	3,690,145	3,698,383	3,706,558
3,664,549	3,690,230	3,698,416	3,706,787
3,666,005	3,690,296	3,698,855	3,706,890
3,666,512	3,690,380	3,698,881	3,706,940
3,666,763	3,690,405	3,699,094	3,708,343
3,666,992	3,690,414	3,699,113	3,714,267
3,667,115	3,690,606	3,699,219	
3,667,561	3,690,816	3,699,277	
3,669,164	3,690,975	3,699,351	

National Technical Information Service

GOVERNMENT-OWNED INVENTIONS

Notice of Availability for Licensing

The inventions listed below are owned by the U.S. Government and are available for licensing in accordance with the GSA patent licensing regulations.

Copies of patent applications, either paper copy (PC) or microfiche (MF), can be purchased from the National Technical Information Service (NTIS), Springfield, Va. 22151, at the prices cited. Requests for copies of patent applications must include the patent application number and the title. Inquiries and requests for licensing information should be directed to the address cited on the first page of each copy of the patent application.

Paper copies of patents cannot be purchased from NTIS but are available from the Commissioner of Patents, Washington, D.C. 20231, at $0.50 each. Inquiries and requests for licensing information should be directed to the "Assignee" as indicated on the copy of the patent.

DOUGLAS J. CAMPION,
Patent Program Coordinator, National Technical Information Service.

DEPARTMENT OF THE INTERIOR

Patent 3,712,821. Production of Fisheries Products. Filed January 5, 1970. Patented January 23, 1973. Not available NTIS.

Patent application 316,935. Poly(N-Amido) Imides as Semiimpermeable Membranes. Filed December 20, 1972. PC $3/MF $0.95.

Patent application 325,969. Filament Wound Reverse Osmosis Support Tubes. Filed January 23, 1973. PC $3/MF $0.95.

Patent application 248,705. Device and Process for Magneto-Gravimetric Particle Separation Using Non-Vertical Levitation Forces. Filed April 28, 1972. PC $3/MF $0.95.

TENNESSEE VALLEY AUTHORITY

Patent application 276,591. Improved Nitrogen Solutions and Suspensions. Filed July 31, 1972. PC $3/MF $0.95.

Patent application 268,520. Improved Coating Processes. Filed July 3, 1972. PC $3.50/MF $0.95.

DEPARTMENT OF TRANSPORTATION

Patent application 286,848. Explosive Effluent Detector. Filed September 7, 1972. PC $3/MF $0.95.

Patent application 310,340. Non-Linear Amplification Technique for Improving Signal to Noise Contrast. Filed November 29, 1972. PC $3/MF $0.95.

Patent application 273,746. Lime Silico-Phosphate Cement. Filed July 21, 1972. PC $3/MF $0.95.

[FR Doc. 73-6322; Filed 4-3-73; 8:45 am]

Dedications

3,237,539.—*Jack D. Layton*, Salem, Oreg. LIFT MECHANISM. Patent dated Mar. 1, 1966. Dedication filed Dec. 14, 1972, by the inventor and the assignee, *Layton Manufacturing Co.*

Hereby dedicate to the Public the entire remaining term of said patent.

3,363,407.—*William D. Drummond*, Burlington, Ontario, Canada. HARVESTER PLATFORM WITH LATERAL FLOAT AND ATTITUDE CONTROL MEANS. Patent dated Jan. 16, 1968. Dedication filed Jan. 24, 1973, by the assignee, *International Harvester Company.*

Hereby dedicates said Letters Patent to the Public.

Disclaimers

2,918,571.—*Robert Peth*, Chicago, Ill. COMMUNICATION SYSTEM. Patent dated Dec. 22, 1959. Disclaimer filed Dec. 29, 1972, by the assignee, *Motorola, Inc.*

Hereby enters this disclaimer to claims 8, 9 and 10 of said patent.

3,154,060.—*Alf Hundere*, San Antonio, Tex. RECIPROCATING-PISTON GASOLINE ENGINE FUEL-AIR RATIO CONTROL. Patent dated Oct. 27, 1964. Disclaimer filed Dec. 14, 1972, by the assignee, *Alcor Aviation Inc.*

Hereby enters this disclaimer to claims 1 through 5 of said patent.

3,318,062.—*Paul R. Grants*, Roselle Park, N.J. PRECAST INSULATING MASONRY UNIT AND INSULATING FILLER. Patent dated May 9, 1967. Disclaimer filed Oct. 24, 1972, by the inventor.

Hereby enters this disclaimer to claims 1–4, and 7 and 9 of said patent.

3,320,317.—*William A. Rogers*, Lake Jackson, Tex., and *James E. Woehst*, Savannah, Ga. QUATERNARY AMMONIUM ADDUCTS OF POLYEPICHLOROHYDRIN. Patent dated May 16, 1967. Disclaimer filed Dec. 22, 1972, by the assignee, *The Dow Chemical Company.*

Hereby enters this disclaimer to claims 1–4 of said patent.

3,341,982.—*Robert Torresen*, Muskegon, Mich. BOWLING BALL POLISHING MACHINE. Patent dated Sept. 19, 1967. Disclaimer filed Jan. 15, 1973, by the assignee, *Brunswick Corporation.*

Hereby enters this disclaimer to claims 9–13, inclusive, of said patent.

3,356,934.—*Martin O. Halfhill*, and *Harold C. Stephens*, San Jose, Calif. DOUBLE FREQUENCY RECORDING SYSTEM. Patent dated Dec. 5, 1967. Disclaimer filed Jan. 11, 1973, by the assignee, *International Business Machines Corporation.*

Hereby enters this disclaimer to claim 1 of said patent.

3,484,303.—*Roger S. Babcock*, Chatham, N.J. STEEL SURFACE TREATMENT. Patent dated Dec. 16, 1969. Disclaimer filed Aug. 22, 1972, by the assignee, *Union Carbide Corporation.*

Hereby enters this disclaimer to claims 1–12 of said Letters Patent.

PATENT EXAMINING CORPS

R. A. WAHL, Assistant Commissioner
WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF APRIL 3, 1973

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—M. STERMAN, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	1-20-72
GENERAL ORGANIC CHEMISTRY, GROUP 120—I. MARCUS, Director. Heterocyclic; Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	3-16-72
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—L. J. BERCOVITZ, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	12-15-71
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—A. P. KENT, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	12-17-71
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—R. FRIEDMAN, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	12-10-71
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—N. ANSHER, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	8-21-72
SPECIAL LAWS ADMINISTRATION, GROUP 220—R. L. CAMPBELL, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy. Rocket Fuels; Radio-Active Material.	6-16-72
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	7-03-72
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—L. FORMAN, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	12-22-71
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—W. L. CARLSON, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	1-05-72
DESIGNS, GROUP 290—R. L. CAMPBELL, Director. Industrial Arts; Household, Personal and Fine Arts.	5-26-71
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—A. BERLIN, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	5-01-72
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—D. J. STOCKING, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus: Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	2-03-72
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—A. RUEGG, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	4-10-72
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—M. M. NEWMAN, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	3-06-72
MISCELLANEOUS CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—T. J. HICKEY, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	1-28-72

Expiration of patents: The patents within the range of numbers indicated below expire during April 1973, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... **Numbers 2,740,117 to 2,743,441, inclusive**
Plant Patents..... **Numbers 1,467 to 1,471, inclusive**

DEFENSIVE PUBLICATIONS

PUBLISHED MAY 1, 1973

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent Office makes no assertion as to the novelty of the disclosed subject matter.

T910,001
ELECTROPLATABLE POLYPROPYLENE OR POLYALLOMER COMPOSITION

William Williamson Blount, Jr., 1129 Oakleaf Drive, Kingsport, Tenn.

Continuation of application Ser. No. 17,899, Mar. 9, 1970. This application Jan. 13, 1972, Ser. No. 217,691
Int. Cl. C08f *3/08*
U.S. Cl. 260—23 H
No Drawing. 11 Pages Specification

This invention relates to polypropylene and polyallomer compositions having a flow rate of about 2 to 10 decigrams per minute, about 0 to 20% by weight of the composition of an inert filler and about 1 to 10% by weight of the composition of an organic epoxide or epoxy resin. It has been found that articles formed from these compositions can be readily etched and electroplated giving superior metal to substrate adhesion. A preferred embodiment includes 3 to 5% by weight of talc, clay, or silica fillers and 3 to 5% of epoxies such as expoxidized linseed oil, epoxidized tall oil ester, alicyclic diepoxy adipate, octyl epoxytallate, or the glycidyl ether of bisphenol-A. A phenolic stabilizer and a mold release agent such as calcium stearate may also be added. Articles having a metal coating of copper or nickel are prepared by first using a chemical electroless plating systems followed by electrolytic deposition of the metal.

T910,002
PHOTOGRAPHIC BLEACH COMPOSITIONS

Lynn R. Hotter, 1669 Lake Ave., Rochester, N.Y. 14650

Filed Feb. 22, 1972, Ser. No. 228,386
Int. Cl. G03c *5/32*
U.S. Cl. 96—60
No Drawing. 10 Pages Specification

Solutions containing (1) a trivalent iron complex of an aminopolycarboxylic acid, such as ammonium ferric ethylenediamine tetraacetate, and (2) an alkali metal or ammonium bromide or iodide salt are effective bleach solutions for use in color photographic processes. Following use of such bleach solutions to oxidize photographic silver images and removal of the oxidation products from the photographic element with a thiosulfate fixing solution, the silver can be recovered in high yield from the fixing solution using conventional electrolytic methods of silver recovery. This is an important advantage as compared to known bleach-fix compositions containing a trivalent iron complex of an aminopolycarboxylic acid as a bleaching agent and a thiosulfate as a fixing agent since it is difficult to recover silver from such bleach-fix solutions by electrolytic means because of the presence of iron salts. The level of bromide or iodide salt in the bleach solution should be such that substantially no fixing occurs but substantial conversion of silver to silver halide occurs. Preferably, the bleach solution should contain about 30 to about 400 grams of the iron complex and about 3 to about 20 grams of iodide salt or about 50 to about 350 grams of bromide salt per liter.

T910,003
PAINT REMOVER COMPOSITIONS

Eugene D. Klug, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed May 26, 1972, Ser. No. 257,364
Int. Cl. C09d *9/00*
U.S. Cl. 252—171
No Drawing. 8 Pages Specification

Improved paint removers are prepared based on chlorinated aliphatic hydrocarbon solvents thickened by means of a crosslinked allyl-hydroxyalkyl cellulose derivative. Crosslinking of the cellulose derivative is preferably effected by a nitrile N-oxide. Other more conventional crosslinking methods and materials are also effective. The disclosed paint removers are effective on substantially any conventional type of paint, varnish, shellac or the like in either scrape-off or flush-off formulations.

T910,004
BLUE ANTHRAQUINONE DYES FOR RADIOGRAPHIC FILM BASE

Robert F. Coles, Lake Elmo, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 18, 1972, Ser. No. 281,835
Int. Cl. G03c *1/84*
U.S. Cl. 96—87 R
No Drawing. 7 Pages Specification

Heat stable, blue, anthraquinone dyes which are suitable for inclusion in polyester film base include 1,4-bis (2,6-diisopropylanilino) anthraquinone and 1,4-bis(2-ethyl-6-methylanilino) anthraquinone.

T910,005
RADIATION SENSITIVE POLYACETYLENIC COMPOSITIONS FOR FLUORESCENT IMAGES

Arthur A. Rasch, Webster, and Wilbur C. Hodges, Rochester, N.Y. (both of Kodak Park, Rochester, N.Y. 14650)

Filed Nov. 9, 1972, Ser. No. 305,200
Int. Cl. G03c *5/04*
U.S. Cl. 96—48
No Drawing. 19 Pages Specification

Films prepared from specific polyacetylenic compositions may be exposed to electron beam or short wave ultraviolet radiation, resulting in colorless or low contrast image formation in the exposed areas. When these materials are subsequently subjected to overall ultraviolet radiation of longer wavelength, fluorescent images appear in exposed areas. Such images may be utilized for electronic readout, image amplification, or photocopying.

REISSUES

MAY 1, 1973

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

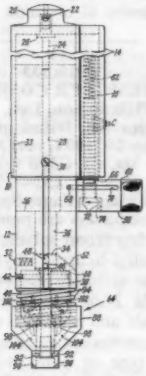
27,628
FIRE EXPLOSIVE TOOLS

Albert E. Newton and Paul C. Rumball, Beverly, Mass., assignors to USM Corporation, Flemington, N.J., and Boston, Mass.

Original No. 3,554,424, dated Jan. 12, 1971, Ser. No. 746,220, July 19, 1968. Application for reissue Nov. 1, 1971, Ser. No. 190,461

Int. Cl. B25c *1/14*

U.S. Cl. 227—8 **13 Claims**



An explosively actuated device for driving pins and studs, for instance, by using only one hand. Compact and simple in structure, the tool preferably employs an impact-ignitable primerless charge for generating gas pressure, a simple means for advancing successive charges from a supply source on the tool into firing position, and safety features preventing premature ignition. The loaded tool may be manually pushed against the locality of a work piece which is to receive a fastener in order to initiate the explosion resulting in the fastener driving.

27,629
TRIAZOLINE DERIVATIVES

Hiroshi Tanida and Teruji Tsuji, Osaka, Japan, assignors to Shionogi & Co. Ltd., Osaka, Japan

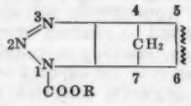
No Drawing.. Original No. 3,598,836, dated Aug. 10, 1971, Ser. No. 798,220, Sept. 18, 1968, which is a division of Ser. No. 505,400, Oct. 27, 1965. Application for reissue Feb. 23, 1972, Ser. No. 228,777

Claims priority, application Japan, Nov. 5, 1964, 39/62,796

Int. Cl. C07d *55/02*

U.S. Cl. 260—308 B **4 Claims**

Compounds of the formula:



and the acid addition salts thereof, wherein R represents lower alkyl, aryl or ar(lower) alkyl and wherein the symbol ⁞ represents hydrogen atoms at positions 5 and 6, a double bond between said positions or a condensed benzene ring between said 5- and 6-positions said ring being unsubstituted or substituted with one or more substituents selected from lower alkyl, lower alkoxy, halogen, amino, alkylamino, di(lower)alkylamino and cyano. The compounds are useful as intermediates for production of anti-depressants or psychomotor stimulants.

27,630
ABATEMENT OF ACTIVE SOIL SLIDES

Edward D. Graf, 1680 Bryant St., Daly City, Calif. 94015, and Jason G. Kuhn, 2913 E. Desert Cove, Phoenix, Ariz. 85028

No Drawing. Original No. 3,503,215, dated Mar. 31, 1970, Ser. No. 729,387, May 15, 1968. Application for reissue Feb. 8, 1971, Ser. No. 110,348

Int. Cl. E02d *3/12, 3/14*

U.S. Cl. 61—35 **7 Claims**

Treatment of an active soil slide by directly contacting at least a portion of the slip surface with an aqueous solution of a soil stabilizing agent selected from lime, *and a water soluble ionized chemical containing soil strengthening cations of the type that stabilize the lattice of the soil particles by mechanisms including ion exchange with exchangeable cations naturally occurring in the soil particle lattice* [trivalent metal cations, a low molecular weight amine having up to about 8 carbon atoms, calcium orthophosphate, ammonium phosphate, and calcium chloride].

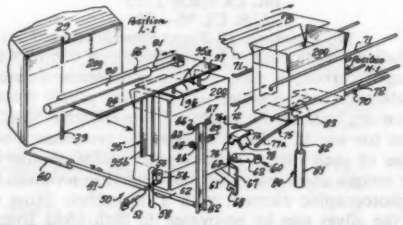
27,631
FOLDABLE CASE SETUP APPARATUS

Joseph C. Berney, Corona Del Mar. Calif. (174 La Verne Ave., Long Beach, Calif. 90803)

Original No. 3,435,738, dated Apr. 1, 1969, Ser. No. 482,801, Aug. 26, 1965. Application for reissue Mar. 29, 1971, Ser. No. 129,160

Int. Cl. B31b *1/80;* **B65b** *43/30*

U.S. Cl. 93—53 R **16 Claims**



A case erecting apparatus includes a fed magazine which delivers a stack of knocked-down cases, an opening mechanism for sequentially opening the cases as they are removed from the stack, pivotal arms for closing the bottom end flaps at a station adjacent to magazine, and a transfer device which feeds a case with its bottom end flaps closed into a plow for closing the bottom side flaps. The opening mechanism includes a reciprocating suction

device which grips the foremost panel of the front case in the stack and pulls it from the stack, fingers which momentarily restrain the rearmost panel of the front case to open the case, and stationary break plate in the path of the foremost end panel to shape the case to rectangular configuration. After the pivotal arms have closed the bottom end flaps, they serve as tracks to support those flaps while the transfer device moves the case into the plows. As additional features, a ram overfolds the bottom flaps, and an adhesive applicator may be used to seal the bottom flaps.

27,632

ENGINE COOLING AND PASSENGER COMPARTMENT HEATING APPARATUS FOR MOTOR VEHICLES

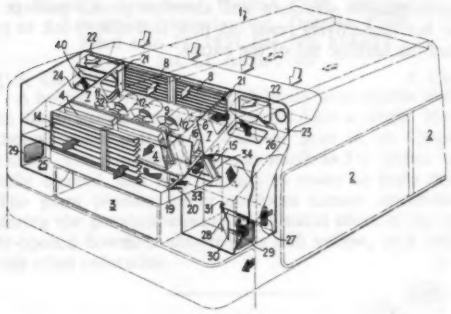
Anthony Geoffrey Plackett, Craigmore, East End. North Leigh, Witney, Oxfordshire, England

Original No. 3,528,607, dated Sept. 15, 1970, Ser. No. 701,492, Jan. 29, 1968. Application for reissue Sept. 16, 1971, Ser. No.181,277

Claims priority, application Great Britain, June 30, 1967, 4,501/67

Int. Cl. B60h *1/02*

U.S. Cl. 237—2 **11 Claims**



Combined engine cooling and passenger compartment heating apparatus for a road vehicle in which electrically driven fans blow air through a heat exchanger in the engine coolant circuit and the air required to heat the passenger compartment is passed to a mixing compartment from which air can flow to the passenger compartment, the remainder of the heated air being exhausted to the vehicle exterior. Unheated air is also blown into the mixing compartment and the proportions of unheated and heated air entering the mixing compartment is controlled to reduce short term temperature fluctuations of the air entering the passenger compartment from the mixing compartment.

27,633

HYDRAULIC MECHANISMS FOR BOATS WITH TILTABLE PROPELLER HOUSING

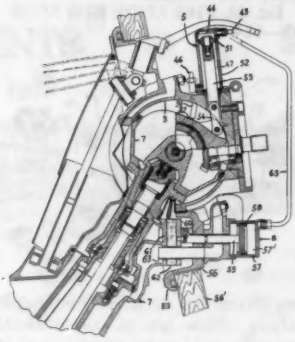
Karl Abdon Bergstedt, Goteborg, Sweden, assignor to AB Penta, Goteborg, Sweden

Original No. 3,548,777, dated Dec. 22, 1970, Ser. No. 868,661, Aug. 27, 1969, which is a continuation of Ser. No. 614,301, Feb. 6, 1967. Application for reissue Dec. 14, 1971, Ser. No. 207,777

Int. Cl. B63h *1/14, 5/06*

U.S. Cl. 115—41 HT **43 Claims**

An outboard power leg mechanism including two hydraulic cylinders, valve means connected to the cylinders and a cam for controlling the valve means to retain the outboard leg in a selected desired position of tilt. A cutoff valve is connected to one of the hydraulic cylinders to lock the leg against tilting during reverse propulsion operation and a relief valve is provided to permit the leg to kickup



during forward propulsion when striking an underwater object.

27,634

METHOD AND APPARATUS FOR BENDING AND TEMPERING GLASS SHEETS

James H. Cypher, New Kensington, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

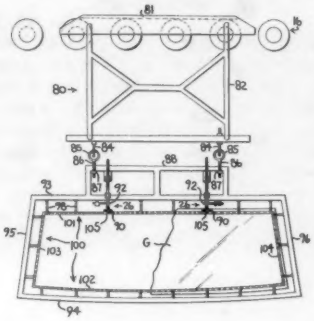
21, 1970, Ser. No. 65,849

572,043, Aug. 12, 1966. Application for reissue Aug.

Original No. 3,510,286, dated May 5, 1970, Ser. No.

Int. Cl. C03b *23/02, 27/00*

U.S. Cl. 65—104 **9 Claims**



An outline shaping surface is supported in an oblique plane by a carriage. The outline shaping surface has an upper shaping rail having at least one notch in it. A pair of tongs suspended from the carriage hangs freely within the notch. A glass sheet is partially supported by the tongs near its upper edge, and the lower edge of the glass engages the lower portion of the outline mold to support the glass in a second oblique plane. During heating, the glass sags by gravity toward the outline mold and increases its contact with the mold. Then the glass is pressed between a pair of complementary shaping members having shaping surface conforming to that of the outline mold while the glass is closely adjacent to the mold. The shaping members have a notched upper edge in alignment with the notches in the outline mold. The members are retracted and the glass sheet, while supported on the outline shaping surface, is tempered.

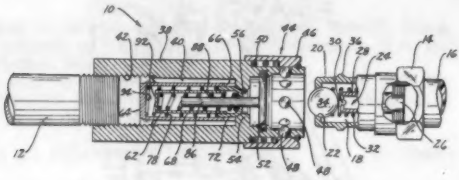
27,635
COUPLING DEVICE

Larry A. Kopaska, Guthrie Center, Iowa 50115

Original No. 3,490,491, dated Jan. 20, 1970, Ser. No. 615,456, Feb. 13, 1967. Application for reissue May 10, 1971, Ser. No. 141,482

Int. Cl. F16k *15/00*; F16l *37/28*

U.S. Cl. 137—614.05 20 Claims



A coupling device for detachably connecting first and second conduits which are in communication with a source of hydraulic fluid under pressure and an apparatus to be powered by the hydraulic fluid, respectively, the second conduit including a check valve means, and an actuator means in the coupling device to permit the connection of the conduits when one or more thereof is under pressure, the actuator means also adapted to unseat the check valve at times and also adapted to prevent the undesirable seating of the check valve during the operation of the equipment to which the conduits are connected.

27,636
BALLPOINT PEN FOR WATER-SOLUBLE INK

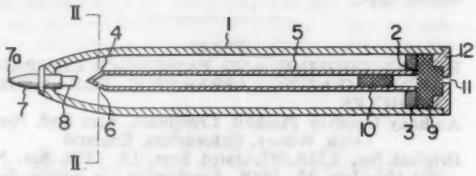
Yukio Horie, Tokyo-to, Japan, assignor to Dainihon Bungu Kabushiki Kaisha, Tokyo-to, Japan

Original No. 3,446,564, dated May 27, 1969, Ser. No. 668,443, Sept. 18, 1967. Application for reissue Apr. 29, 1970, Ser. No. 32,962

Claims priority, application Japan, Mar. 31, 1967, 42/19,881

Int. Cl. B43k *7/02*

U.S. Cl. 401—217 8 Claims



A pen outer barrel is filled directly with water-soluble ink, which is fed to the ball of a ballpoint and is air vented and pressure relieved by a device including an inner cylinder with a small vent hole, a gas-permeable structure, an ink absorber, and a cap plug having an air vent hole and capping the rear end of the barrel. The gas-permeable structure and absorber permit passage of air but respectively resist ink flow and absorb ink to prevent ink leakage out of the barrel.

PLANT PATENTS

GRANTED MAY 1, 1973

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

3,321
ROSE PLANT
Maria Molina, Santa Ana, Calif., assignor to Clarence Amling Roses, Inc., Santa Ana, Calif.
Filed Jan. 18, 1971, Ser. No. 107,599
Int. Cl. A01h *5/00*
U.S. Cl. Plt.—20 **1 Claim**

A rose plant of the hybrid tea class, discovered as a sport of the rose Baccara (Plant Patent No. 1,367) but of distinct red color, and is less affected by weather conditions, with more abundant flowers produced on strong growth.

3,322
ROSE PLANT
David L. Armstrong, Upland, Calif., assignor to Armstrong Nurseries, Inc., Ontario, Calif.
Filed Apr. 15, 1971, Ser. No. 134,517
Int. Cl. A01h *5/00*
U.S. Cl. Plt.—15 **1 Claim**

A hybrid tea rose plant which bears large yellow blooms on long, strong stems. Most stems bear a single bloom, though some may bear three or four in an irregular cluster. The flower may span as much as 5½ inches when fully opened, and may contain as many as forty petals. The plant blooms freely outdoors almost continuously during the growing season. The general effect of the newly-opened flower is almost pure rich yellow, with little if any other coloration.

3,323
ROSE PLANT
David L. Armstrong, Upland, Calif., assignor to Armstrong Nurseries, Inc., Ontario, Calif.
Filed Apr. 16, 1971, Ser. No. 134,911
Int. Cl. A01h *5/00*
U.S. Cl. Plt.—28 **1 Claim**

A rose plant of the fluoribunda class which bears small bright red blooms on normal strength, medium length stems. Sometimes the flowers are borne singly, though usually there are from three to several to a stem in an irregular cluster. The flowers are about 2½ to 2¾ inches across when fully opened, having about 15 or 20 petals. The plant blooms abundantly outdoors almost continuously during the growing season. The general color effect of the newly-opened flowers is strong red.

3,324
STERILE DICENTRA PLANT
Marie S. Sperka, Rte. 2, Crivitz, Wis. 54114
Filed Apr. 26, 1971, Ser. No. 137,456
Int. Cl. A01h *5/00*
U.S. Cl. Plt.—68 **1 Claim**

Sterile bloom of unique deep red color (more nearly true red than the bloom of any previously known bleeding heart) is produced abundantly on a vigorous and hardy plant continuously from spring until frost.

3,325
NECTARINE TREE
Frederick W. Anderson, Merced, Calif., assignor to Reedley Nursery, Inc., Reedley, Calif.
Filed Sept. 23, 1971, Ser. No. 183,285
Int. Cl. A01h *5/03*
U.S. Cl. Plt.—41 **1 Claim**

A dwarf nectarine tree which is of medium size, vigorous, spreading, dense, foliated with large acutely pointed lanceolate leaves having a crenate margin and reniform glands, and a regular and very productive bearer of medium to small size, uniform, symmetrical, globose, clingstone fruit—which ripens about a month before the freestone Golden Prolific (United States Plant Patent No. 2,193)—having yellow skin substantially overspread with red, and firm, crisp, yellow flesh; the surface of the pit cavity being red, and the flesh having flecks of red therein.

PATENTS

GRANTED MAY 1, 1973

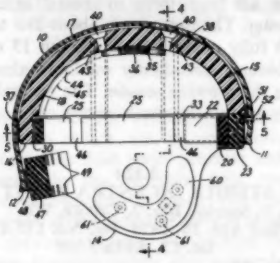
GENERAL AND MECHANICAL

3,729,744

PROTECTIVE HELMET FOR FOOTBALL OR THE LIKE

Frederick A. Rappleyea, Schiller Park, Ill., assignor to Cougac, Inc., Schiller Park, Ill.

Filed April 1, 1971, Ser. No. 130,308
Int. Cl. A42b *3/00*
U.S. Cl. 2—3 R **12 Claims**



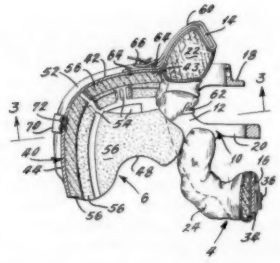
A protective helmet having an outer durable shell and an inner replaceable liner of expanded, closed cell, plastic material of a type which is capable of absorbing energy by taking a permanent set. The liner is fitted about its inner periphery, with spaced sizer pads of foam rubber or the like, the sizer pads being removably secured by pairs of fabric fastening strips having surfaces formed with hooks and loops respectively. An insert of foam rubber or the like is provided at the front edge of the liner and extending slightly below the edge of the shell to protect the bridge of the nose as well as the forehead. The liner is moreover provided with grooves encircling the liner in a vertical direction, and the liner and shell both have perforations which communicate with the grooves for ventilating the space between the head of the wearer and the liner as well as between the liner and the shell. A neck piece in the form of a pad of resilient foam rubber or the like is removably secured inside the rear edge of the shell and extending below the level thereof in a position to bear against the neck of the wearer.

3,729,745

PROTECTIVE DEVICE FOR THE HEAD

Roland N. Latina, Belleville, Ill., assignor to A-T-O Inc., Willoughby, Ohio

Filed Nov. 4, 1971, Ser. No. 195,647
Int. Cl. A41d *13/00*
U.S. Cl. 2—9 **8 Claims**



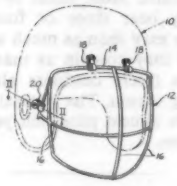
A protective device includes a face mask backed with padding and a helmet sized and configured to generally cover the top, back and sides of the user's skull. The helmet has a top margin which abuts the padding extending along the top of the face mask and forms a line about which the mask will swing relative to the helmet. An upper strap attaches the upper part of the helmet to the top section of the face mask, but does not prevent the two from pivoting relative to each other. The midportion of the face mask is connected by means of adjustable side straps to an elastic band which extends around the back of the helmet and urges the face mask and helmet together. The protective device is easily and quickly put on and removed merely by spreading the helmet and face mask apart against the force exerted by the elastic band, in which case the face mask will swing about the upper margin of the helmet so as to temporarily enlarge the size of the protective device.

3,729,746

ARRANGEMENT FOR CONNECTING A FACE GUARD TO A HELMET

Delby C. Humphrey, Terre Haute, Ind., assignor to Schutt Manufacturing Company, Litchfield, Ill.

Filed April 30, 1971, Ser. No. 139,087
Int. Cl. A42b *3/00*
U.S. Cl. 2—9 **7 Claims**



The specification discloses an athletic helmet, such as a football helmet, with a face guard mounted thereon, in which the face guard is in the form of a grid of rigidly interconnected bars with a resilient coating thereon. The connector arrangement provides for pivotally connecting the face guard to the helmet at the lower front edge of the helmet so that the face guard can swing in the fore and aft direction while strap elements are provided connecting the face guard to the helmet at the sides of the helmet, and normally preventing the aforementioned fore and aft movement. The last mentioned connector elements are somewhat resilient and can be cut with a knife to permit the face guard to be swung away from the player's face in case it is necessary to give the player emergency treatment.

3,729,747

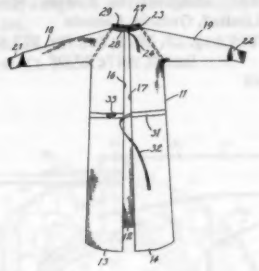
HOSPITAL GARMENT

Nathan L. Belkin, 4 Shepard Road, West Hartford, Conn.

Filed April 29, 1971, Ser. No. 138,499
Int. Cl. A41b *9/00*
U.S. Cl. 2—114 **9 Claims**

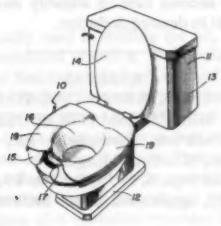
A hospital gown with a simplified tying arrangement and capable of being work with either side out and tied easily under either condition. A single tape on one side extends through an opening or loop on the other side and is tied on itself to hold the edges closed. There may also be another tape

on the other edge to engage an opening or loop on the first edge so the gown can be worn with either side out, and there



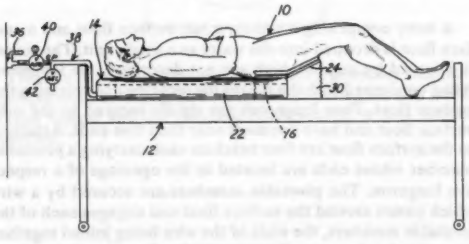
may be such tapes and openings or loops at both the neck and waist.

3,729,748
SITZ BATH
Richard J. Perlman, Worcester, Mass., assignor to J.M.R. Enterprises, Inc., Worcester, Mass.
Filed Dec. 2, 1971, Ser. No. 203,988
Int. Cl. A47k 3/22
U.S. Cl. 4—6 **7 Claims**



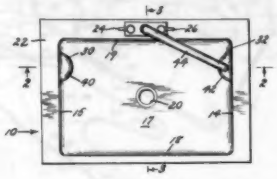
This invention relates to a sitz bath comprising a bowl and more particularly, to a bowl having upwardly extending wings or flanges to embrace the seat of a toilet for medical treatment of the human body, the bowl having downwardly extending locking flanges located at the outer edge of each wing closely adjacent the sides of the toilet seat and lips to provide for overflow of medicinal liquid.

3,729,749
TOILET FACILITY
Charles E. Rosecrans, 2798 Eric Avenue, Central Point, Oreg.
Filed Nov. 23, 1971, Ser. No. 201,499
Int. Cl. A61g 9/00
U.S. Cl. 4—113 **8 Claims**



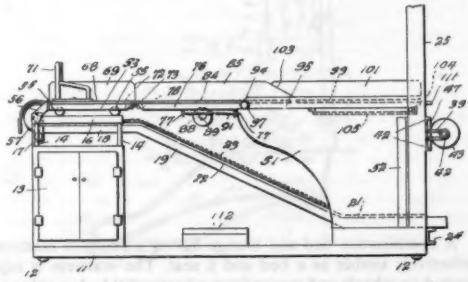
This invention provides a bedpan substitute for bedridden persons. A thin rigid platform combined with an underlying collapsed but inflatable support is placed alongside the patient and the patient is then rolled or slid onto the support in a supine posture and the collapsed support is then inflated, either with oxygen, compressed air or (preferably) carbon dioxide, uniformly to raise the support by a substantial distance, say of several inches. The support is notched at its lower end and supports at that end a peripherally recessed, partly upturned, rigid ring, which extends well beyond the platform, to which an open-mouthed, water-tight, disposable bag may be secured, open side up, by suitable means such as a rubber band.

3,729,750
LAVATORY SINK CONSTRUCTION
Gino Giglio, 105 West 13th Street, New York, N.Y.
Filed Sept. 10, 1970, Ser. No. 71,187
Int. Cl. E03c 1/14, 1/18
U.S. Cl. 4—187 **6 Claims**



A lavatory, sink, tank, or the like, having a fluid-containing basin with a hose or pivotally mounted fluid inlet spigot dimensioned to extend to a position overlying the lateral edges of the basin. The basin itself is contoured with at least two oppositely disposed splash columns along the side walls thereof, positioned adjacent to the side walls, where the pivotally mounted fluid inlet spigot radius and side wall meet, the columns being arcuate in horizontal cross section along the side walls, and contoured so that water impinging upon the top surface of the column from the fluid inlet nozzle or hose will be deflected towards the opposite side of the basin. In effect, two oval portions of the sink bottom — where it joins the side — have been raised higher than the surface of a half-filled sink.

3,729,751
PARAPLEGIC BED
Wayne V. Kirkman, 960 42nd St., West Palm Beach, Fla.
Filed April 26, 1971, Ser. No. 137,399
Int. Cl. A47c 3/32
U.S. Cl. 5—66 **7 Claims**



This invention comprises a paraplegic bed having three portions, a foot portion, a body portion or seat portion, and a back and head portion; the portions are provided with means for maintaining all three portions in coplanar alignment, and changing the angle of the plane, and means are provided for changing the plane of each portion with respect to any of the others portions; and means are provided for selectively chang-

ing the seat portion both longitudinally and transversely with respect to the foot portion and back portion; said means for changing positions and relationship of parts is preferably electric push button actuated.

3,729,752
ORTHODONTIC CRADLEBOARD

Hal A. Huggins, 100 East Cheyenne Road, Colorado Springs, Colo.

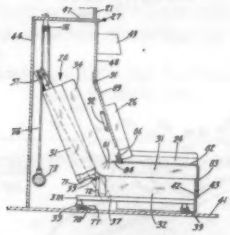
Filed July 6, 1971, Ser. No. 159,775
Int. Cl. A47d *7/00*
U.S. Cl. 5—93 R **8 Claims**

The orthodontic cradleboard comprising a base having head, body and leg member supporting portions, the member supporting portions having member-conforming surfaces, each having raised marginal edges for restricting lateral shift of the members when positioned thereon, the member-conforming surfaces being stepped with regard to each other downwardly from the leg member-conforming surface to the head member-conforming surface.

3,729,753
BED AND LOUNGE UNIT

Clarence R. Johnson, 1304 Blackman Avenue, Duluth, Minn., and Jay T. Kidder, 4920 Vallacher Avenue, Minneapolis, Minn.

Filed Dec. 27, 1971, Ser. No. 212,079
Int. Cl. A47c *13/35*
U.S. Cl. 5—2 R **17 Claims**

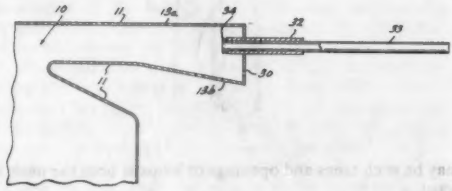


A combination bed and lounge having a foldable mattress selectively usable as a bed and a seat. The mattress is supported on wheels and moves from a horizontal bed position to a seat position relative to an upright cabinet or wall. The head section of the mattress is guided upwardly into the cabinet by guide rails attached to the inside walls of the cabinet. A transverse cushion attached to the front of the cabinet alternately serves as a bed head board and a seat back rest. Upright arm rests are removably mounted on opposite sides of the foot section of the mattress. Each arm rest has a removable top cap.

3,729,754
INFLATABLE AIR CUSHION ARTICLE

James T. Hastings, and Paul Boulaine, both of Brantford, Ontario, Canada, assignors to Canam Manufacturing & Packaging Limited, Ontario, Canada

Filed Aug. 13, 1971, Ser. No. 171,625
Int. Cl. A47c *27/08*
U.S. Cl. 5—348 **6 Claims**

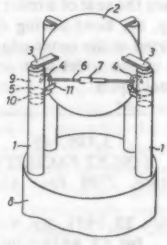


Two plies of polyethylene sheet material are sealed around their edges to form an air-tight enclosure for use as a cushion or the like. A valve preventing escape of air is constituted by a narrow elongated neck formed of the plies themselves, separate valve elements being avoided. The valve effect is due to tension in the material at the neck. The article is inflated through a tube sealed into an extension of the valve neck. In a modification, a second tube is slidably mounted within the first tube to assist in desired deflation.

3,729,755
IMPROVEMENTS RELATING TO RELEASE MECHANISM FOR BUOYS

Peter Ronald Cochrane, Springfield, Pa., assignor to Emi Limited, Hayes, Middlesex, England

Filed Sept. 8, 1970, Ser. No. 69,655
Claims priority, application Great Britain, Sept. 10, 1969, 44,725/69
Int. Cl. B63b *21/52*
U.S. Cl. 9—8 R **1 Claim**

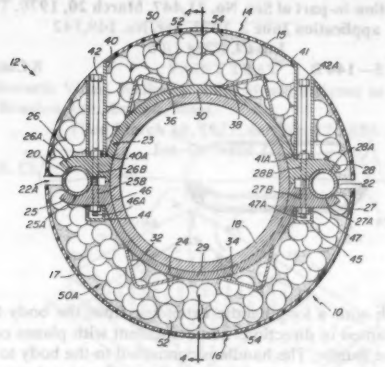


A buoy comprising a sinker, a sub-surface float and a surface float is dropped into the water as a single unit. The sinker is released by means which are not described, the invention being concerned with the means for securing and releasing the surface float. Four longerons are rigidly secured to the sub-surface float and have openings near their free ends. Attached to the surface float are four brackets each carrying a pivotable member whose ends are located in the openings of a respective longeron. The pivotable members are secured by a wire which passes around the surface float and engages each of the pivotable members, the ends of the wire being joined together by a timed release mechanism which after a predetermined time releases the ends of the wire and thus releases all the pivotable members simultaneously.

3,729,756
FLOTATION ASSEMBLY

Sidney D. Cook, Warwick, R.I., and Louie W. Watkins, Jr., Brookline, Mass., assignors to Data Packaging Corporation, Cambridge, Mass.

Filed Feb. 17, 1971, Ser. No. 116,031
Int. Cl. B63b *21/52*; E21b *7/12*
U.S. Cl. 9—8 R 9 Claims

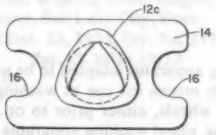


A riser pipe, usually used in drilling for oil, has an annular flotation collar positioned about it. This collar comprises a pair of semiannular flotation members each of which includes a semicircular outer shell of fiberglass, a semiannular low density core preferably including a plurality of plastic hollow spheres surrounded by a syntactic foam, and arcuately-shaped clamping means embedded in the core. Passages through one of the semiannular flotation members provide access to the clamping means so that it may be secured to the riser pipe. The clamping means also includes recesses for holding the choke and kill lines in place on opposite sides of the riser pipe and spaced therefrom.

3,729,757
SELF-LOCKING NUT

Thomas B. Wright, Diamond Bar, Calif., assignor to TRW Inc., Cleveland, Ohio

Continuation of Ser. No. 12,801, Feb. 19, 1970, abandoned.
This application Jan. 13, 1972, Ser. No. 217,682
Int. Cl. B21d *53/24*
U.S. Cl. 10—86 A 1 Claim



This is a lock nut which is formed into a generally elliptical configuration or triangular configuration having arcuate walls, is then tapped and the resulting configuration is then further distorted.

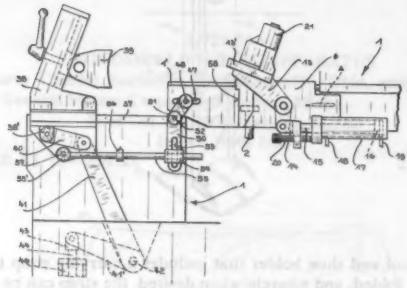
ERRATUM

For Class 11—1 R see:
Patent No. 3,730,512

3,729,758
TOE-LASTING MACHINE

Herbert Schindler, Wagenstrasse 38, Pirmasens, and Tilo Loffler, Gersbacherstr. 20, Pirmasens-Winzeln, both of Germany

Filed Nov. 8, 1971, Ser. No. 196,480
Claims priority, application Germany, Nov. 10, 1970, P 20 55 213.0
Int. Cl. A43d *21/00*
U.S. Cl. 12—10.5 8 Claims

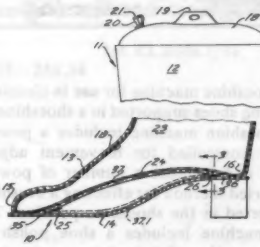


A toe-lasting machine having wipers or tuck-in devices for an upper leather of a shoe in a joint area of a last, wherein a large part of the adjusting operations of the tuck-in devices are automatic. The toe-lasting machine includes a machine frame, a first carriage with a heel support, a second carriage with a wiper head and wipers, and a pair of support tuck-in devices. The tuck-in devices are mounted on the second carriage. An adjustable linkage system is supported on the first carriage and on the machine frame. The linkage system is set to serve as a limiting stop in co-operation with a detent associated with the second carriage which supports the tuck-in devices.

3,729,759
BOOT TREE

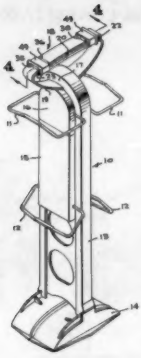
Louis Szabo, 2009 Trutch Street, Vancouver, British Columbia, Canada

Filed April 21, 1972, Ser. No. 246,395
Int. Cl. A43d *5/00*
U.S. Cl. 12—114.4 7 Claims



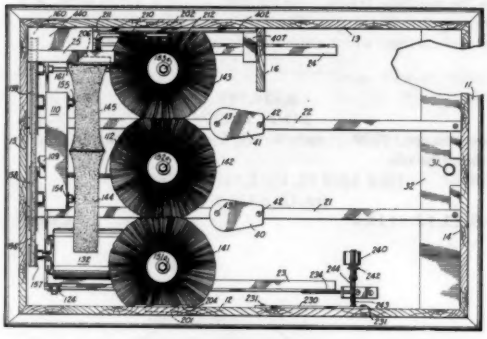
A boot tree having an inflatable member shaped, when inflated, to conform to the inside of a boot and arched member extending longitudinally of and beneath the inflatable member for transmitting pressure of the inflatable member to the heel and toe of the sole of the boot.

3,729,760
STRAP FOR BOOT AND SHOE HOLDER
Ivor J. Allsop, P.O. Box 23, Bellingham, Wash.
Filed May 28, 1971, Ser. No. 147,900
Int. Cl. A43d *5/00*
U.S. Cl. 12—120.5 **6 Claims**



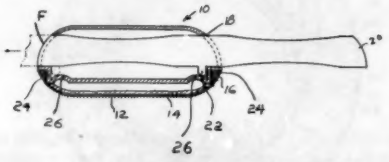
A boot and shoe holder that includes a carrying strap that can be folded, and wherein when desired, the strap can be extended to permit the user to insert the arm therethrough.

3,729,761
AUTOMATIC SHOESHINE MACHINE
George D. Lashley, 3098 Old Norcross Road, Tucker, Ga.
Filed Sept. 21, 1971, Ser. No. 182,319
Int. Cl. A47l *23/02*
U.S. Cl. 15—31 **22 Claims**



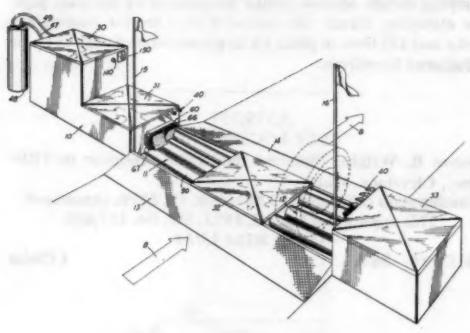
An automatic shoeshine machine for use in cleaning, applying polish and buffing shoes supported in a shoeshine position. The automatic shoeshine machine includes a power driven carriage cyclically controlled for movement adjacent the shoeshine position and includes a number of power driven brush means supported thereon for effecting a brushing action of the shoes supported in the shoeshine position. The automatic shoeshine machine includes a shoe polish applying means, wherein the shoe polish applying means includes a shoe polish container means supported in position to be contacted by the shoe brushing means. The container means includes a movable cover means which is cyclically controlled for movement from a closed non-shoe polish applying position to an open shoe polish applying position, in timed relationship relative to the cycle of operation of said movable carriage means. An electrically operable control system is operatively associated with the movable carriage means and the shoe polish applying means for effecting cyclic operation of the movable carriage and cyclic operation of the shoe polish applying means. A coin operated switch means is operatively associated with the cyclically operable control means for initiating a shoeshine operation.

3,729,762
BRUSH HANDLE ADJUSTMENT
Eric Michael Roth, Unionville, Ontario, Canada
Continuation-in-part of Ser. No. 21,447, March 20, 1970. This application June 2, 1971, Ser. No. 149,142
Int. Cl. B25g *1/06*
U.S. Cl. 15—144 B **8 Claims**



A brush with a long handle extending from the body has bristles slanted in directions non-coincident with planes containing the handle. The handle is connected to the body to be moved between opposed positions relative thereto where opposite ends extend from the handle.

3,729,763
WHEEL WASHING APPARATUS
Robert M. Coley, 609 Irwin Avenue, Ocilla, Ga.
Filed Aug. 4, 1971, Ser. No. 168,867
Int. Cl. B60s *3/04*
U.S. Cl. 15—21 B **23 Claims**



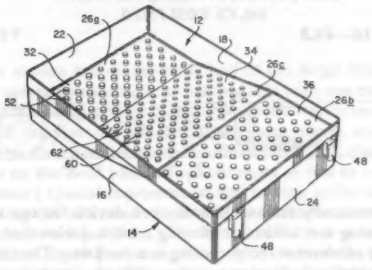
Wheel washing apparatus adapted to be associated with automatic car wash means for use in washing the outside surfaces of vehicle wheels, either prior to or after washing the vehicle body. The wheel washing apparatus includes a pair of laterally spaced wheel washing stations located on the apparatus and operatively associated with each other for contacting and washing the outside surfaces of vehicle wheels supported in position adjacent the station. Each of the wheel washing stations includes means for dispensing a cleansing medium on the vehicle wheels and means for effecting a scrubbing action of the wheels to effectively clean the wheels in a washing operation. Wheel supporting and rotating means is positioned adjacent each of the wheel washing stations for rotating the wheels to effect the scrubbing action on the wheels. The wheel supporting and rotating means includes a roller assembly supported adjacent each wheel washing station, with the roller assembly including a number of roller ele-

ments rotatable about substantially parallel axes with the axes of the roller elements being angularly disposed relative to the axis of the vehicle wheels for automatically centering the vehicle wheels between the laterally spaced wheel washing station in response to rotation of the roller support elements. The roller support elements include power drive means selectively operable between driving and non-driving conditions. The power drive means includes braking means which is applied automatically to hold the roller elements in a braked condition in response to movement of said power drive means to a non-driving condition.

3,729,764
PAINT TRAY

Ellsworth Vines, Wellesley Hills, Mass., assignor to Baltimore Brushes, Inc., Boston, Mass.

Filed March 10, 1971, Ser. No. 122,835
Int. Cl. B44d *3/12*
U.S. Cl. 15—257.06 **17 Claims**

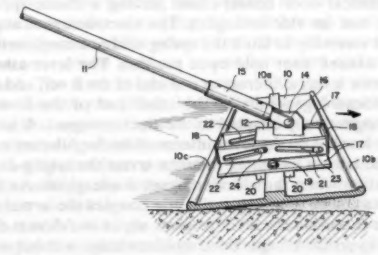


A reversible paint tray designed for serving thixotropic paint from a compartment on one side and conventional oil or water base paint from a second compartment on the other side is molded in one piece of a nonwettable plastic. A multiplicity of spaced-apart, generally cylindrical studs project up from the bottom of the one compartment. These studs have sharp upper edges which provide a toothed engagement with a napped surface of a paint roller so that when the roller is pulled across the bottom of the compartment, the teeth "dig" into the roller surface to complete a force couple which rotates the roller despite the opposition provided by the thixotropic paint. The other tray compartment has formed on its bottom wall the usual ribs arranged in a herringbone design and short stubs which suffice to rotate the roller immersed in the less viscous oil and water-base paint.

3,729,765
SELF-TILTING TROWEL FOR CONCRETE

William D. Peterson, Kearns, Utah, assignor to Weyher Construction Company, Salt Lake City, Utah

Filed Dec. 23, 1971, Ser. No. 211,354
Int. Cl. E01c *19/12*
U.S. Cl. 15—235.8 **7 Claims**

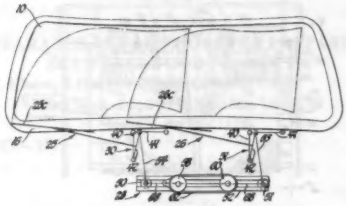


A long-handled trowel device for leveling wet concrete includes mechanism attaching a handle to a trowel for automatically tipping the trowel along its far edge as a fulcrum during pull strokes and along its near edge on push strokes, so the trowel will always be properly oriented during troweling action. The automatic trowel-tipping mechanism comprises a carriage pivotally attached to the handle and moveable back and forth along a trackway rigidly secured to the top of the trowel. Carriage and trackway are interconnected by camming means, preferably made up of forward and rearward cam tracks sloping upwardly towards each other to peak intermediate the width of the trowel and forward and rearward cam followers placed in the respective cam tracks at similar positions with respect to the lengths of such tracks for simultaneous back and forth travel therein at mutually different ascending and descending levels.

3,729,766
WINDSHIELD WIPING APPARATUS

Harry Charles Buchanan, Jr., Centerville, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 20, 1970, Ser. No. 82,363
Int. Cl. B60s *1/06*
U.S. Cl. 15—250.21 **2 Claims**

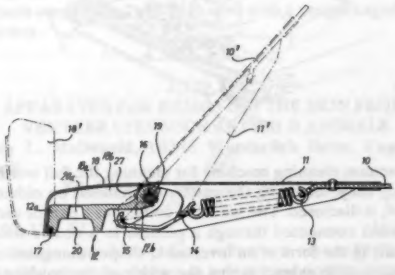


In a preferred form, this disclosure relates to a windshield wiping apparatus for wiping a windshield of an automotive vehicle. The windshield wiping apparatus comprises a windshield wiper and an actuating mechanism including a swingable linkage means for supporting the wiper and for effecting movement of the wiper transversely of the windshield through one portion of its stroke and for arcuately moving the wiper between a generally vertical position toward a generally horizontal position during another portion of its stroke.

3,729,767
DEVICE FOR FASTENING A WINDSHIELD WIPER ARM ON A DRIVE SHAFT

Reinhard Edele, Bietigheim; Alfred Kohler, and Kurt Bauer, both of Kleiningersheim, all of Germany, assignors to SWF-Spezialfabrik fuer Autozubehoer Gustav Rau GmbH, Bietigheim, Germany

Filed Dec. 29, 1971, Ser. No. 213,472
Claims priority, application Germany, Feb. 4, 1971, P 21 05 101.4
Int. Cl. B60s *1/34*
U.S. Cl. 15—250.34 **17 Claims**



A receiving member, formed of a first section and a second section which extends laterally from the first section, is used

for connecting a windshield wiper arm to a drive shaft. An opening is provided to the first section in which the drive shaft is secured. The wiper arm is articulated to the second section at a position spaced from the opening in the first section. To prevent leakage into the drive shaft bearing, a cover member is articulated to the first section of the receiving member and fits over the first section and a portion of the second section. The cover member is arranged so that it can be pivoted upwardly from the receiving member for permiting access to the drive shaft regardless of the position of the wiper arm. Further, the pivot axes of the cover member and the wiper arm in the receiving member are disposed in parallel relationship.

3,729,768

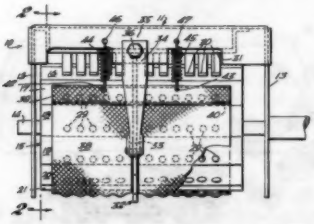
BURNISHING DEVICE FOR ROTARY TELEVISION SET TUNERS' CONTACTS

David E. Gurkin, 3165 S.W. 18th Street, Miami, Fla.

Filed July 6, 1971, Ser. No. 159,978

Int. Cl. H03j *3/00*

U.S. Cl. 15—256.51 **5 Claims**



A flexible fabric sling-type wiping member is described for application against longitudinally-extending sets of electrical contact points of tuner strips in a rotary drum tuner for wipe cleaning the points as the tuner is rotated during use while changing from channel to channel. A flexible woven fabric is supported in embracing, sling-like fashion over a substantial portion of the periphery of the rotary drum tuner and supported thereat by the tuner drum housing.

3,729,769

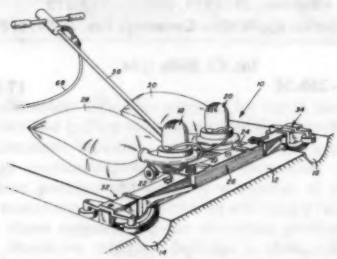
BOWLING LANE VACUUM CLEANER

Samuel H. Sharpless, 61-69 N. Pine St., Hazelton, Pa.

Filed July 8, 1971, Ser. No. 160,716

Int. Cl. A47l *5/28*

U.S. Cl. 15—347 **29 Claims**



A vacuum cleaning machine for cleaning the full width of a bowling alley, including the gutters or channels on either side thereof, is disclosed. The machine comprises a pair of vacuum units each connected through a plenum to a nozzle which is generally in the form of an inverted U-shaped elongated channel designed to extend across the width of the bowling lane. The nozzle carries downwardly-extending brushes which serve to loosen the material that is to be picked up by the vacuum units. Each end of the nozzle is adapted to receive an extension which acts as an auxiliary nozzle, with each auxiliary carrying at its outer end a brush arrangement for cleaning the bowling alley gutters. The extensions are fastened to the upper surface of the main nozzle to form air passages which communicate through an opening in the nozzle so that air and entrained particles from the gutters can be drawn into the vacuum units. A pivoted arm is affixed to the front and back of the channel extension and carries at its outer, free end a curved brush which is adapted to the shape of the alley channel so as to loosen the dust which is to be picked up. The material entrained in the air flow of the vacuum cleaner is carried to a suitable storage bag, in conventional manner.

3,729,770

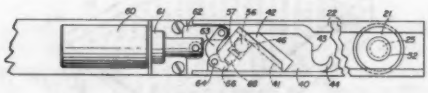
ELECTRICALLY CONTROLLED HOLD-OPEN DEVICE

Thomas R. Lasier, Princeton, Ill., assignor to Schlage Lock Co., San Francisco, Calif.

Filed June 24, 1971, Ser. No. 156,413

Int. Cl. E05f *15/20*

U.S. Cl. 16—48.5 **7 Claims**



An electrically releasable hold-open device for use with a door closing mechanism employing a latch device that is engaged by an element reciprocating in a trackway. The element when moved to hold-open position shifts the latch device up an inclined ramp to a location in which the latch device is releasably held by retaining means. The retaining means is controlled by an electrically energized solenoid so that it is released in the event of an emergency.

3,729,771

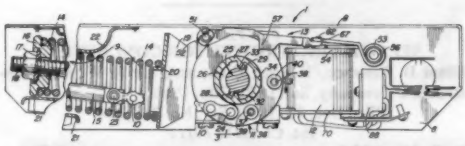
LATCHING LEVER ASSEMBLY FOR DOOR HOLDER-CLOSER

Burke J. Crane, Lombard; Richard E. D'Hooge, Wood Dale, both of Ill., and Frank D. Roberts, North Reading, Mass., assignors to Rixson-Firemark Inc., Franklin Park, Ill.

Filed March 1, 1972, Ser. No. 230,735

Int. Cl. E05f *16/20*

U.S. Cl. 16—48.5 **10 Claims**

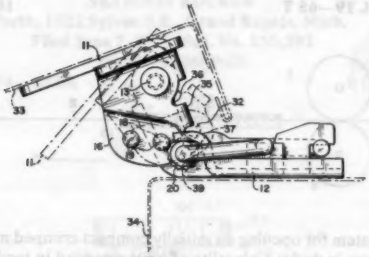


An improved latching lever assembly for use in an electromechanical door holder-closer having a closer spring, a dashpot, and an electromagnet. The electromagnet actuates the lever assembly to latch the spring-dashpot combination to effect a desired door hold open position. The lever assembly comprises a lever, a fulcrum at one end of the lever, and an armature located generally at the other end of the lever and electromagnetically coupled to the electromagnet. A latching detent is located on the lever intermediate the fulcrum and armature to latch a camming roller to arrest the spring-dashpot combination when the electromagnet is energized. An armature-lever coupling spring resiliently couples the armature to the lever to enable the lever to pivot about its fulcrum during manual override of the door holder-closer without a corresponding movement of the armature relative the energized electromagnet, thereby eliminating armature release noises.

3,729,772
TORSION BAR HOLD-OPEN HINGE

Joseph H. Marchione, Rockford, Ill., assignor to Atwood Vacuum Machine Company, Rockford, Ill.

Filed March 13, 1972, Ser. No. 233,974
Int. Cl. E05d *11/10*
U.S. Cl. 16—145 13 Claims



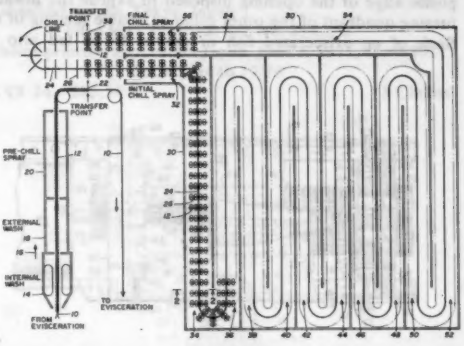
The torsion bar on the body half of the hinge has a fluted roller rotatably mounted on and movable with one end of it in lieu of the usual arrangement of two such rollers mounted in spaced relation on the door half with rivets and spring washers. This permits using two shouldered pins riveted on a flange on the door half and spaced more or less to meet each customer's special requirements and serving as the means for actuating the aforesaid single roller to hold the door open in predetermined positions. The fluted roller has a concentric cylindrical shank portion against which a tab on the body half bears under spring loading of the torsion bar to hold the roller against turning except upon rolling contact with the striker pins. Since the fluted roller is always held against turning except during rolling contact with the pins when the shank of the roller is moved clear of the tab it is always assured of proper orientation with the respective pins, which is important because the pins have to register properly with the troughs in the flutes for correct hold-open operation in each open position of the door. The roller has a blind hole to receive the one end of the torsion bar limiting endwise movement of the roller in one direction while a horizontal surface on a flange on the door half has abutment with the flat top surface on the roller to retain it against endwise movement in the other direction, the torsion bar in turn being retained in assembled position on the body half by a flattened portion on the opposite end of the bar.

3,729,773
METHOD FOR WASHING AND CHILLING EVISCERATED FOWL

Janus J. Dillon, Irving, Tes., assignor to FEI, Inc., Dallas, Tex.

Filed Nov. 26, 1971, Ser. No. 202,202
Int. Cl. A22c *21/00*
U.S. Cl. 17—11 34 Claims

A process for washing and cooling fowl for human consumption includes conveying the fowl through a plurality of processing zones. After evisceration, the fowl are conveyed to a first zone where they are internally washed and externally washed. The fowl are then conveyed through a second zone where they are prechilled. Thereafter, the fowl are transferred from a first conveyor system to a second conveyor system, the latter including shackles which can suspend a plurality of fowl from a single truck on a conveyor. The fowl are then conveyed on the multiple fowl shackle through a third zone in which they are cooled by contact with a chilled liquid spray and by contact with a cold gas stream. In the third zone the fowl are conveyed through a multi-path arrangement in a plurality of subzones. Except for the entry and exit points from one subzone to another, the subzones are divided by walls. The chilled liquid and the cold gas are directed in a predetermined pattern through the plurality of subzones. When the fowl are removed

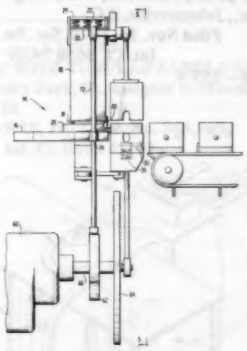


from the third zone, they are transferred to another processing line for packaging or the like.

3,729,774
APPARATUS AND METHODS FOR PREPARING SKEWERED FOOD PRODUCTS

Philip Y. Chow, 3 Harran Circle, Orinda, Calif.

Filed Sept. 15, 1971, Ser. No. 180,670
Int. Cl. A47j *43/18*
U.S. Cl. 17—15 3 Claims



The food is sliced into strips and disposed between a pair of corrugated platens. The platens, when closed, have registering guide slots through their complementary corrugated faces for receiving a skewer The skewer is inserted through the openings and a food strip between the platens while a blade cuts the next food strip. The skewered food is picked up and conveyed through a sauce bath, a dryer, an oil bath and through an oven. From the oven, the individual skewered food products are grouped and packaged with a prepackaged sauce container.

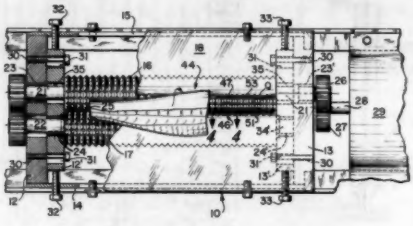
3,729,775
APPARATUS FOR REMOVING THE SKIN FROM VERTEBRATES SUCH AS FISH & ANIMALS

Emery L. McDonald, 10395 Wunderlich Drive, Cupertino, Calif.

Filed July 26, 1971, Ser. No. 166,128
Int. Cl. A22c *25/17*
U.S. Cl. 17—62 10 Claims

A machine in which pulling rollers are covered by a countertop lid having an opening in a depressed portion thereof exposing the pinchline between the rollers and providing a guard

with one edge of the opening overlying the inwardly turning quadrant of one roller to the pinchline thereof and the opposite edge of the opening disposed to expose the inwardly turning quadrant of the other roller to enable feeding of one flank of an eviscerated fish or animal to be fed into the



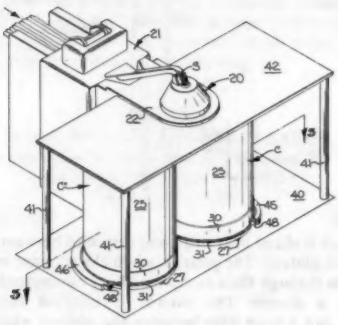
pinchline and be cleaved from the flesh as it rolls in unison with the pulling action and rotative contact with the exposed quadrant of such other roller whereby the meat is flipped over and guided upwardly and out of the depressed area by the guard overlying the upper quadrant of the adjacent roller.

3,729,776

SLIVER CAN DONNING AND DOFFING APPARATUS FOR COILERS

Herman S. Johns, Patterson, N.C., assignor to Wellman Industries, Inc., Johnsonville, S.C.

Filed Nov. 24, 1970, Ser. No. 92,435
Int. Cl. B65h *54/80*
U.S. Cl. 19—159 A **28 Claims**



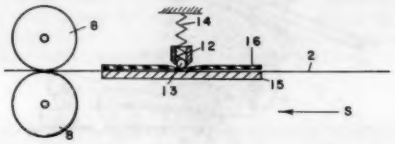
Sliver cans are donned by moving them inwardly in alternation, first from one side of a coiler head, then from the opposite side of the coiler head, into coiling position under the coiler head, and the coiling position under the can moved inwardly from one side of the coiler head is offset from the coiling position of each can moved inwardly from the opposite side of the coiler head. Also, each sliver can moved inwardly to coiling position from one side of the coiler head is rotated in one direction during the coiling operation, and each sliver can moved inwardly to coiling position from the opposite side of the coiler head is rotated in the opposite direction during the coiling operation. The doffing of each full can of sliver is effected simply by utilizing a succeeding can being moved into coiling position for engaging and pushing the full can outwardly from under the coiler head.

3,729,777

SYSTEM FOR OPENING CRIMPED MULTIFILAMENT BANDS

Manfred T. Hoffman, Newburyport, Mass., and Lawrence W. Healy, Johnsonville, S.C., assignors to Wellman, Inc., Boston, Mass.

Filed May 21, 1971, Ser. No. 145,794
Int. Cl. D01d *11/02*
U.S. Cl. 19—65 T **10 Claims**



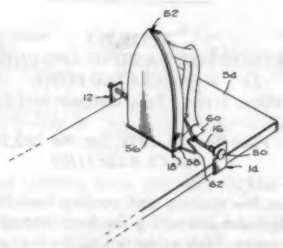
A system for opening an initially compact crimped multifilament tow includes a plurality of units arranged in tandem and performing different functions. One or more of the units are primarily intended to deregister the crimped portions of the tow, or band, by imparting a braking action on the latter at ever changing laterally spaced points. The deregistration unit of the system includes an elastomeric blanket resting on a solid support and compressed at a plurality of laterally spaced points by a plurality of roller bodies (balls or rollers) supported by a common carriage movable transversely to the band to be deregistered. The band is sandwiched between the blanket and support, and drawn by means of tension rolls, through the gap formed between the blanket and the support. The system further includes a band spreading unit for imparting the desired ultimate width to the deregistered band. The spreading action in this unit is effected by supporting the band upon a bed formed by extension springs whose length is progressively increased in the direction of the travel of the band. This, in turn, is achieved by supporting the extension springs by a pair of diverging conveyer belts.

3,729,778

IRON GUARD

Raymond F. McGrath, 7303 Winnetka Avenue, Canoga Park, Calif.

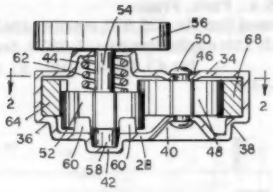
Filed Jan. 28, 1972, Ser. No. 221,588
Int. Cl. A44b *21/00*; D06f *79/02*
U.S. Cl. 24—73 **9 Claims**



An improved iron guard is provided which includes a spaced pair of holding means such as clamps to releasably engage the sides of an ironing board, a flexible connecting means interconnecting the holding means and adapted to releasably engage the handle of an iron, resilient means such as a spring associated with the connecting means and holding means to tension the former and to releasably secure a heel bracket in tight engagement with the heel of an iron to hold the same securely in an upright position without danger of tipping over the iron. The bracket is secured to the connecting means,

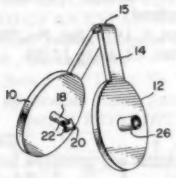
which may be a chain, cord or the like. The bracket is of special configuration to quickly and adequately engage the heel of an iron.

3,729,779
SKI BOOT BUCKLE
Karl A. Porth, 1522 Sylvan S.E., Grand Rapids, Mich.
Filed June 7, 1971, Ser. No. 150,392
Int. Cl. A43c *11/00*
U.S. Cl. 24—68 SK **8 Claims**



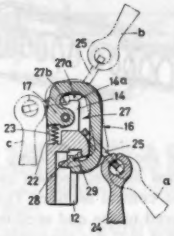
An adjustable boot buckle, preferably for ski boots, has a tongue member with racks which are received by a clasp having gears which engage the racks of the tongue. The gears are movable to locking and unlocking positions and have a knob for adjusting the tension of the buckle and unlocking the buckle for adjustment.

3,729,780
CLAMP
Robert L. White, 15th Michigan Bldg. B-1 No. 8, Joplin, Mo.
Filed July 8, 1971, Ser. No. 160,705
Int. Cl. A44b *9/10*, *17/00*
U.S. Cl. 24—156 **7 Claims**



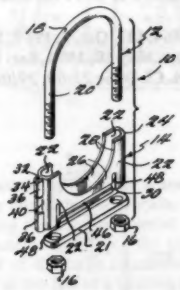
A clamp having discs carried at opposed ends of a foldable connecting strap, one of said discs carrying a projecting pointed penetrating shaft, the other of said discs carrying a shaft receiving sleeve, and interengaging means between the shaft and sleeve to secure the opposed discs in folded clamping position.

3,729,781
SLIDER FOR CONCEALED ZIP FASTENERS
Takeo Fukuroi, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed May 31, 1972, Ser. No. 258,338
Claims priority, application Japan, June 2, 1971, 46/46591
Int. Cl. A44b *19/30*
U.S. Cl. 24—205.14 K **3 Claims**



A slider assembly of the automatically locking type is provided for use with a concealed zip fastener and characterized by the provision of means for retaining a pull tab in the back of the slider body against unintentional movement so that the tab is normally concealed from external view.

3,729,782
CLAMP ASSEMBLY WITH TUBULAR SADDLE MEMBER
Todd R. Downing, Tinley Park, Ill., assignor to Maremont Corporation, Chicago, Ill.
Filed April 18, 1972, Ser. No. 245,169
Int. Cl. B65d *63/00*
U.S. Cl. 24—277 **9 Claims**



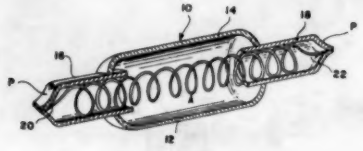
A clamp assembly for effecting a substantially gas-tight connection between the telescoping end portions of two thin-walled tubes, such as exhaust system parts or the like, embodying an improved saddle member in the form of a rigid tubular structure having inwardly open end sections which receive the clamping forces and a central tube engaging section to which the clamping forces are transmitted in a manner similar to the loading of a beam to impart clamping pressure to the tube connection throughout the periphery thereof.

3,729,783

MINIATURE INCANDESCENT LAMP AND APPARATUS AND METHOD FOR MAKING THE SAME

Donald J. Belknap, Takoma Park, Md., assignor to Nelson H. Shapiro, Rockville, Md. and Milton M. Field, Alexandria, Va., part interest to each

Division of Ser. No. 760,852, Sept. 19, 1968, Pat. No. 3,578,429. This application May 4, 1971, Ser. No. 140,259
Int. Cl. H01j *9/18*
U.S. Cl. 29—25.13 **6 Claims**



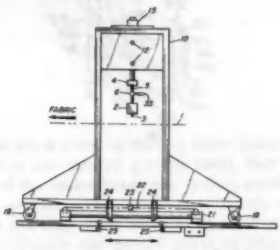
Microminiature incandescent lamp having a tubular envelope with a glass central section and metal end sections heat-sealed to the central section. The envelope contains a filament coil secured to the end sections by mechanical cold-weld pinch-offs that seal the previously evacuated envelope. Envelopes are formed seriatim by feeding the components to an assembly station where the end sections are partially inserted into the central section. The resulting assemblies are conveyed to a sealing station where heat is directed only to the metal end regions of the envelope, so that only the end regions of the glass section are deformed in sealing. Filaments are formed and inserted into the envelopes by pulling a length of filament wire through a tubular guide, inserting an envelope over the guide, winding a filament coil from the end of the filament wire projecting from the guide, and then pulling the envelope over the finished filament. The outer diameter of the filament coil is initially greater than the inner diameter of the end sections of the envelope, so that the coil is stretched in length and reduced in diameter when it is drawn into the envelope.

3,729,784

PROCESS FOR PRODUCING SCULPTURED EFFECTS ON THERMOPLASTIC PILE FABRICS

Charles P. Mazzone, Dover, and Herbert J. Pike, Martinsville, both of N.J., assignors to J. P. Stevens & Co., Inc., New York, N.Y.

Division of Ser. No. 864,437, Oct. 7, 1969, Pat. No. 3,613,186. This application May 19, 1971, Ser. No. 144,957
Int. Cl. D06c *23/00*, *29/00*
U.S. Cl. 26—2 R **6 Claims**



A process is described for moving a series of jets in two directions over a fabric, which may also be moving, or in one direction if the fabric motion provides the other, or the jets may be stationary and the fabric moving in one or more directions. The jets are in a heater manifold and individually supplied by connectors having individual micrometric valve adjustments, the heater head being adjacent the jets and the air and control valves being located where they are not at high temperature. Tilting the jet heads is also described so that the jets may direct hot fluid, such as hot air, at an angle which is adjustable from 90°. The blast of hot fluid from the heated jets softens the nap or pile of the fabric and also bends it down, so that a sculptured effect is produced which resists numerous washings. Typical fabrics are napped acetates and other synthetic fabrics with thermoplastic threads.

ERRATUM

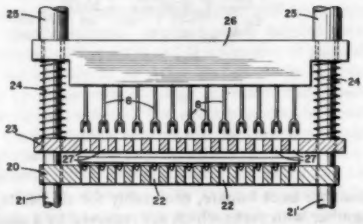
For Class 27—3 see:
Patent No. 3,729,786

3,729,785

TEXTILE, WEB NEEDLING DEVICE

Francois Noel Sommer, Paris, France, assignor to Societe Sommer S.A., Paris, France

Division of Ser. No. 633,073, April 4, 1967, Pat. No. 3,579,763. This application Aug. 7, 1970, Ser. No. 62,090
Int. Cl. D04h *18/00*
U.S. Cl. 28—4 R **2 Claims**



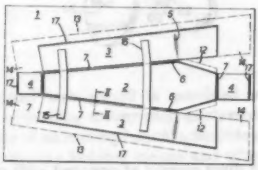
A needle loom for producing a napped or tufted surface upon a non-woven textile fabric which includes a movable support for a web of stretchable textile filaments of fibers to be needled said support being provided with a plurality of needle-receiving cavities in the surface thereof, a movable head spaced from said support and provided with a plurality of needles complementary to the needle-receiving cavities in the surface of the support, the needles each having a smooth shaft and at least two terminal points separated by a recess adapted to receive one or more filaments of a web being needled, and means for moving the head relative to the support whereby the needles penetrate the web and enter the complementary cavities.

3,729,786

CARDBOARD BLANKS AND BOXES FORMED THEREFROM

Rowland Trevor Walding, Lobstock, Churcham, Gloucestershire, England

Filed Sept. 8, 1970, Ser. No. 70,087
Int. Cl. A61g *17/00*
U.S. Cl. 27—3 **1 Claim**



A cardboard blank for erection to form a box is of composite form. It comprises a base panel and separate wall panels attached to a backing sheet in the correct relative positions for erection to form the box with adjoining edge regions of the

separate panels appropriately abutting one another. The outline of the backing sheet is such that it projects at the free side edges of the panels to provide portions which lap over adjoining panels when the blank is erected.

ERRATUM

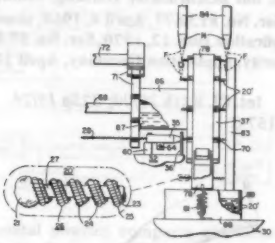
For Class 29—25.130 see:
Patent No. 3,729,783

3,729,787

METHOD AND APPARATUS FOR MANUFACTURING BEADED FILAMENT-COIL COMPONENTS FOR ELECTRIC LAMPS

Clair M. Rively, Old Bridge, and James Petro, Little Falls, both of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 22, 1971, Ser. No. 182,581
Int. Cl. H01j *9/00*
U.S. Cl. 29—25.18 **13 Claims**



The ends of helically-coiled lamp filaments are provided with integral nodules or beads of fused metal which prevent the finished coils from tangling when handled en masse. The beads are formed by mechanically cutting the mandrel-coil composite (stock wire) into segments of uniform length, feeding the segments into a notched circular conveyor means, and indexing the conveyor means relative to a pair of stationary torches so that the flames from the latter melt the ends of the stock wire segments in situ and form the desired nodules of molten metal which then solidify. The unmelted portions of the mandrel are subsequently chemically dissolved from the stock wire segments in the usual fashion — thus providing hollow filament coils of refractory wire that have a fused metal bead at each end.

3,729,788

APPARATUS FOR ADJUSTING THE ALTITUDE OF A CHORD OF AN EXPANDING ROLL

Kan Tawa, Takatsuki, Japan, assignor to Yamauchi Rubber Industry Co., Ltd., Osaka, Japan

Filed June 3, 1971, Ser. No. 149,519
Claims priority, application Japan, June 5, 1970, 45/48613
Int. Cl. B21b *13/02*
U.S. Cl. 29—116 AD **3 Claims**

An apparatus for adjusting the altitude of the chord of an expanding roll comprising;

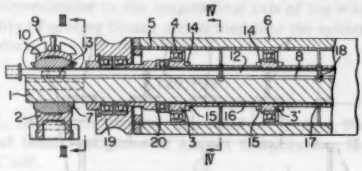
1. a central shaft bent in an arc-shape with the amount of radial deflection increasing successively toward the middle thereof with respect to an imaginary straight line corresponding to the axis of an unbent central shaft,

2. a plurality of eccentric discs or bushes rotatably fitted around said shaft and being spaced lengthwise along the axis thereof, said bushes having their eccentricities increasing successively toward the middle of said shaft,

3. a plurality of sleeves in which said bushes are inserted and are rotatably supported therein by means of intermediate ball bearings,

4. a rubber roll covering said sleeves and integrated therewith to form a single rotatable unit,

5. a plurality of annular coupling members rotatably fitted onto said central shaft and disposed between said bushes and coupled with adjacent bushes,



6. a rod disposed rotatably within a groove extending lengthwise on the periphery of said central shaft and engaged with said annular coupling members in order to rotate same relative to said central shaft,

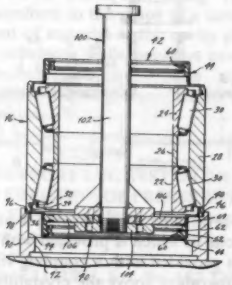
7. and bearings journaling said central shaft so as to keep it fixed thereto, but, in case of need, to permit it to turn therein.

3,729,789

METHOD OF REMOVING A BEARING SEAL ASSEMBLY

Dennis L. Otto, Malvern, Ohio, assignor to The Timken Company, Canton, Ohio

Filed April 19, 1971, Ser. No. 135,168
Int. Cl. B23p *19/00*, *19/02*
U.S. Cl. 29—148.4 S **1 Claim**



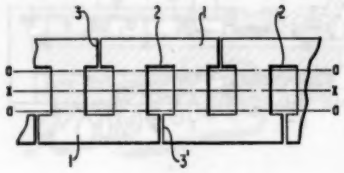
A bearing seal assembly includes a seal case having large and small diameter circumferential walls, a radial connecting wall interconnecting the circumferential walls, and a radial end wall at the outermost end of the small circumferential wall. The free end of the large circumferential wall is press fitted into a socket at the end of a bearing cup so that the small diameter wall projects away from the bearing cup and the bearing cone encircled by that cup. The seal assembly further includes an elastomeric seal having a supporting portion which is bonded to the inner surfaces of the small circumferential wall and the radial end wall. The supporting portion is joined to a seal lip through a web, and that lip engages a wear surface as the cone and cup of the bearing rotate relative to one another. The supporting portion is provided with a shoulder which faces the interior of the bearing and provides a seat against which a removal tool bears for detaching the seal assembly from the bearing cup. The supporting portion is bonded to the seal case for substantial distances on each side of the shoulder so that the removal force does not separate the seal case and the seal.

3,729,790

ONE-PIECE CHANNEL SHAPED PISTON RING

Eisuke Sugahara, Tokyo, Japan, assignor to Nippon Piston Ring Co., Ltd., Tokyo-to, Japan

Filed Oct. 29, 1970, Ser. No. 85,042
Claims priority, application Japan, Oct. 30, 1969, 44/86454
Int. Cl. B23p *15/06*
U.S. Cl. 29—156.63 **3 Claims**



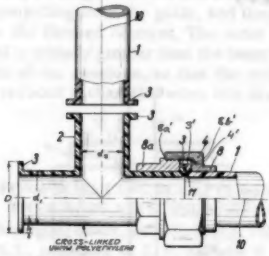
A piston ring has an electrolytic Cr plating applied to the surface of the channel shaped steel article prior to slitting by the grinder to form a plurality of lateral slits.

3,729,791

METHOD OF EFFECTING A PIPE COUPLING

Reiner Theobald, Frankfurt am Main, Germany, assignor to Vereinigte Deutsche Metallwerke AG, Frankfurt am Main, Germany

Filed June 1, 1971, Ser. No. 148,533
Int. Cl. B21d *53/00*; **B21k** *29/00*
U.S. Cl. 29—157 R **4 Claims**



A synthetic-resin pipe fitting having a plurality of tubular arms, at least one of which is provided with an annular transverse flange, is provided with a coupling ring by heating the flange to a temperature above the crystallite melting point or the glass-transition temperature, and forcing the ring over the flange. The fitting is made from a memory-effect synthetic resin, preferably cross-linked polyethylene, so that upon cooling the flange is restored to its original relatively rigid condition and undeflected configuration.

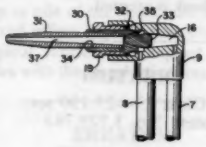
3,729,792

METHOD OF MAKING WELDING TIP FOR CUTTING TORCH

Herbert C. Goss, Glenshaw, Pa., assignor to Goss Gas, Inc., Glenshaw, Pa.

Division of Ser. No. 92,792, Nov. 25, 1970, Pat. No. 3,648,934. This application Nov. 3, 1971, Ser. No. 195,174
Int. Cl. B21d *53/00*
U.S. Cl. 29—157 C **2 Claims**

A welding tip for a cutting torch is made by forming a cylindrical head with a central stem at one end and an axial socket in the other end, and a ring of drilled passages extending from inlets around the base of the stem to the inner end of the socket. A solid rod with an inner end portion that will fit snugly in the head socket is drilled to provide it with a single passage lengthwise through it to form a nozzle. This passage is reamed to taper it from the inner end of the rod substantially to its outer end and to provide the large end of the passage



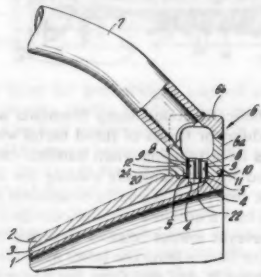
with a diameter great enough to register with the inner ends of all of the head passages when the nozzle is inserted in the socket and sealed therein.

3,729,793

METHOD OF CONSTRUCTING A FLUID COOLED COMBUSTION CHAMBER

Gunther Schmidt, Ottobrunn-Riemerling; Armin Theiss, Munich; Carl-Helmut Dederra, Ottobrunn, and Leonnard Kaiser, Munich, all of Germany, assignors to Bolkow Gesellschaft mit beschrankter Haftung, Munich, Germany

Division of Ser. No. 813,677, April 4, 1969, abandoned. This application June 12, 1970, Ser. No. 57,855
Claims priority, application Germany, April 18, 1968, P 17 51 180.7
Int. Cl. B21k *29/00*; **B23p** *15/26*
U.S. Cl. 29—157 C **2 Claims**



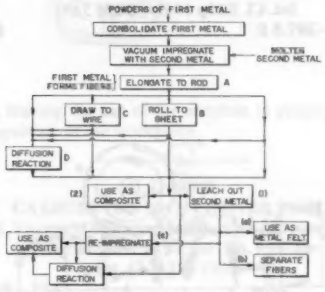
A construction for connecting a plurality of longitudinally extending and circumferentially spaced ducts defined in a wall of a combustion chamber such as a rocket engine nozzle section includes an annular hollow member or ring having a flat connecting wall which is adapted to be abutted against a similar flat wall of the combustion chamber wall to which it is to be associated. The annular member includes an opening for receiving a connectinc onduit but before the connecting conduit is applied, one or more bores defined in the annular member and communicating with the interior thereof are aligned with corresponding connecting bores defined in the combustion chamber receiving wall to which the device is to be connected. The connecting bores in the securing wall are provided with steps at the location of the junction of an outer bore of large diameter which corresponds to the diameter of the bores of the annular member and an inner bore of small diameter. After the bores are aligned, tubular connecting elements are inserted through the bores of the annular member and into the bores of the receiving member to engage on the steps. The cooling ducts in the wall of the receiving member are initially formed by filling an inner wall portion with filling material in the outline of the ducts and then forming the outer wall portion thereover and removing the filling material by melting. After the connecting tubes are positioned between the annular member and the receiving member the abutting flat surfaces of the annular member and the receiving member are connected together by applying a solder to the outer

abutting walls along a widened joint portion formed by a notch in the outer annular member. The two parts are then advantageously heated so the solder flows across the entire abutting joint surface between the annular member and the receiving member. Thereafter, the connecting tube is applied to the annular member and suitably secured and sealed in position such as by welding or by soldering.

3,729,794
FIBERED METAL POWDERS

Richard W. Douglass, Needham, Mass., assignor to Norton Company, Worcester, Mass.

Continuation-in-part of Ser. No. 807,129, March 13, 1969, Continuation of Ser. No. 626,773, March 29, 1967, abandoned. This application Sept. 24, 1970, Ser. No. 74,962
Int. Cl. B22f *7/00*
U.S. Cl. 29—182.1 **12 Claims**

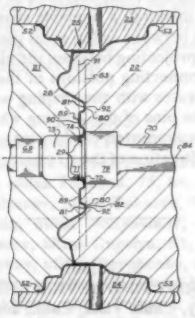


Refractory metal powder compacts are sintered and impregnated with a softer metal. The compacts are reduced to rod, wire or sheet. In the process fine fibers of the metal powder are formed.

3,729,795
METHOD FOR FORMING METAL WHEELS

Ralph E. Roper, Indianapolis, Ind., assignor to Wallace Expanding Machines, Inc., Indianapolis, Ind.

Filed May 17, 1971, Ser. No. 144,155
Int. Cl. B21h *1/02*; B21k *1/32*
U.S. Cl. 29—159.01 **12 Claims**

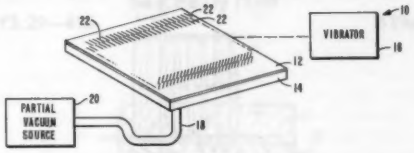


A method and apparatus for forming metal wheel assemblies having a rim and attached spider. A pair of outer dies complementary to the final radial form of the wheel rim are moved together to enclose an annular metal workpiece. A pair of horizontally opposed conical dies are then moved interiorly of the outer dies and annular workpiece. Each conical die has an annular stuffing ledge which contacts the edge of the workpiece. Force is then exerted against the workpiece edges so as to plastically regenerate the workpiece between the conical dies and outer dies; thus, providing thickening of the material in desired areas. A spider extending across the workpiece is axially loaded with the conical dies causing plastic deformation of the spider. A center rod mounted to and projecting from one of the conical dies is concentric with the conical dies and extends through the spider as the spider plastically deforms therearound. A groove formed in one of the conical dies forms a seating ridge in the spider which is defined by a plane perpendicular to the longitudinal axis of the wheel rim. A plurality of seating bosses are formed into the spider by the conical dies.

3,729,796
CORE ASSEMBLY FIXTURE

Victor L. Sell, Santa Monica, and Syed M. S. Alvi, Placentia, both of Calif., assignors to Ampex Corporation, Redwood City, Calif.

Filed July 26, 1971, Ser. No. 165,982
Int. Cl. H05k *13/04*; H01r *43/00*
U.S. Cl. 29—203 MM **9 Claims**

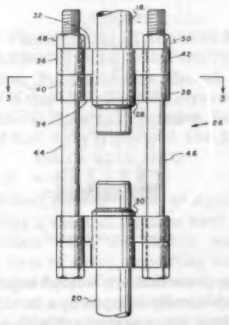


A core assembly fixture for small toroidal magnetic memory cores includes a cavity plate, a partial vacuum generator connected to maintain a partial vacuum on a bottom side of the cavity plate and a vibrator connected to vibrate the cavity plate. A plurality of contoured core receiving cavities are located on the top side of the cavity with a proper orientation for holding magnetic cores in a desired matrix pattern prior to transfer to a substrate for subsequent wiring. The contoured cavities generally conform to the shape of a core, thereby increasing the amount of material in the cavity plate and permitting very thin separator walls between cavities without damage from vibration. The cavity plate construction is laminated in a fashion enabling manufacture with conventional etching techniques.

3,729,797
TEMPORARY SUPPORT LUG SYSTEM ON HANGER TUBES FOR ERECTION OF PRESSURE PARTS

Alwin W. Ambrose, Enfield, and Hersey B. Nelson, West Granby, both of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed June 11, 1971, Ser. No. 152,320
Int. Cl. B23k *37/04*
U.S. Cl. 29—200 P **1 Claim**



A temporary support lug system for hanger tubes is provided by means of which tubular heat exchange members can

be tied together and held in place within a steam generator before and while the necessary welding is accomplished.

3,729,798

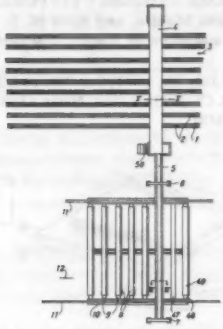
STEEL SECTION HANDLING MECHANISM

Bent Ejlertsen, Herlev, Denmark, assignor to H. Nielsen & Søn Maskinfabrik A/S, Herlev, Denmark

Continuation-in-part of Ser. No. 107,233, Jan. 18, 1971, abandoned. This application July 22, 1971, Ser. No. 165,305

Int. Cl. B23p *19/00*

U.S. Cl. 29—200 A **6 Claims**



A structural steel section handling apparatus for feeding elongated steel sections to a welding machine to be welded to plates. The apparatus includes a traveling crane supported on fixed rails and carrying a plurality of electromagnets arranged in a row and mounted for rotation about a common axis to support the steel sections for transportation in their longitudinal direction to the welding machine and to relate the sections about an axis parallel to the direction of movement.

3,729,799

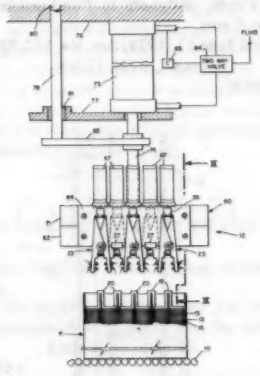
BATTERY TESTING AND CRIMPING DEVICE

William J. Eberle, Reading, Pa., assignor to General Battery Corporation, Reading, Pa.

Filed Oct. 21, 1971, Ser. No. 191,249

Int. Cl. H01m *35/18*; **H01s** *4/00*

U.S. Cl. 29—204 **20 Claims**



Batteries having posts that are welded together across cell partitions are mechanically crimped by a novel apparatus that moves crimping jaws into engagement with post portions to engage the cell partitions to prevent release upon inverting the batteries, such crimping being done substantially simultaneously with respect to a plurality or all of the welded posts that traverse cell partitions, and with these weldments being checked for electrical conductivity, preferably during such crimping operation, as a sequential check, with electrical probes that check the posts for electrical continuity being substantially simultaneously applied to the several posts of a battery.

3,729,800

APPARATUS FOR MANUFACTURING A CONTINUOUS STRINGER FOR A SLIDING CLASP FASTENER

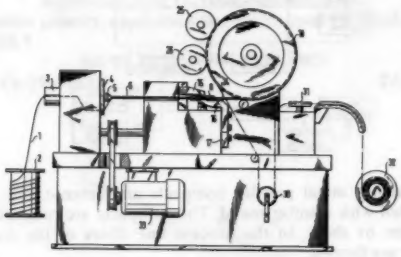
Ernst Popovitsch, Stuttgart-Steckfeld, Germany, assignor to Dr. Karl F. Nagele Feinmaschinenbau, Stuttgart, Germany

Division of Ser. No. 33,469, April 30, 1970, Pat. No. 3,666,853. This application June 8, 1971, Ser. No. 151,017

Claims priority, application Germany, May 2, 1969, P 19 22 605.2

Int. Cl. B23p *19/04*; **B29d** *5/00*

U.S. Cl. 29—207.5 R **8 Claims**



A strand of plastics material is converted into a slide fastener stringer by apparatus including a device for coiling the strand on a mandrel; a pair of wheels toothed according to the desired spacing of the elements in the stringer, the reduced terminating end of the mandrel engaging between the wheels; a braking member in the reception area of the pair of wheels on one side of the mandrel; a heatable shaping wheel having peripheral recesses between radial cross pieces to receive the elements, and pins projecting between the elements to support the element-interconnecting portions of the coiled strand. A kinking disc cooperates with the shaping wheel by means of teeth which face the pins of the shaping wheel and the interconnecting portions supported on the pins and align the same in the longitudinal direction of the stringer.

3,729,801

NUTPLATE RIVETING DEVICE AND METHOD

Gerrett W. Gregory, Chula Vista, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

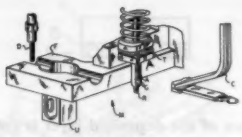
Filed June 18, 1970, Ser. No. 47,541

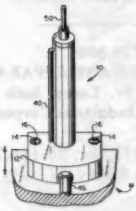
Int. Cl. B23p *11/00*

U.S. Cl. 29—243.53 **6 Claims**

An upstanding housing serves as a lower pressure foot and contains a ram member having a spring loaded pilot pin extending exteriorly above the housing. The pin is adapted to engage in a hole in a nutplate attached to an apertured workpiece by a screw. The pin aligns the hole for drilling and rivet insertion and squeezing. The pin is retractable and becomes

coterminal with the ram member for forming therewith a rivet squeezing anvil. After riveting of the nutplate, the screw is





removed, leaving the nut of the nutplate in proper alignment with the aperture in the workpiece.

3,729,802

CARBURETOR IDLE LIMITER TOOL

Edward E. Lorenz, 184 Evergreen Parkway, Oceanside, Calif.

Filed Dec. 21, 1970, Ser. No. 99,733

Int. Cl. B23p *19/04*

U.S. Cl. 29—254 **1 Claim**

A carburetor idle limiter tool for installing and removing carburetor idle limiters in situ in which a tool rod is provided bent in a generally "S" shape having an insertion tool at one end contiguous with the rod and a withdrawal fitting rotatably coupled to the other end of the rod; first and second hammer stops fixedly attached to and carried by the rod intermediate its ends; and a hammer slidably carried by the rod having a key slot therein for sliding past one of the hammer stops for contact with the other hammer stop.

3,729,803

PROCESS FOR COATING WITH GLASS THE INTERNAL SURFACE OF METAL PIPES

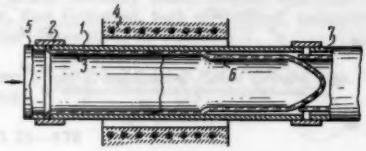
Rafkhat Maksutov, ulitsa Tukaeva, 75, kv. 35; Khalim Akhmetovich Asfandiyarov, ulitsa Tukaeva, 73, kv. 48; Vasily Fedorovich Pashin, ulitsa Neftyanikov, 5, kv. 6; Yakov Fedorovich Gubarev, ulitsa Gogolya, 51, kv. 8; Rifgat Suleimanovich Sadykov, ulitsa Shevchenko, 57, kv. 39; Albert Musagitovich Akhunov, ulitsa Gogolya, 53, kv. 8; Gadel Galyautdinovich Vakhitov, ulitsa Tukaeva, 73, kv. 28; Valery Isaakovich Graifer, ulitsa Parizhskoi Kommuny, 17; Vagiz Murzakhanovich Zyalyaev, ulitsa Gogolya, 51, kv. 5; Gennady Vasilievich Kostrjukov, ulitsa Tukaeva, 53-a, kv. 31, all of Bugulma, U.S.S.R., and Boris Fedorovich Efanov, deceased, late of ulitsa Shevchenko, 53, kv. 35, Bugulma, U.S.S.R. (Olga Iosifovna Efanov, administratrix)

Filed Sept. 12, 1969, Ser. No. 861,217

Int. Cl. B23p *17/00*

U.S. Cl. 29—421 **1 Claim**

A process and installation for coating the internal surfaces of matal pipes with glass including positioning glass bulbs in the pipes and, under pressure, preheating the pipes and glass



bulbs, and rotating the pipes to effect a uniform coating of the glass over the internal pipe surfaces.

3,729,804

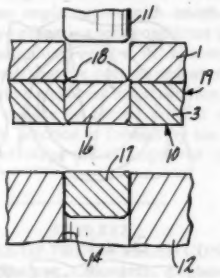
METHOD OF MAKING A MECHANICAL JOINT

Verne L. Middleton, East Alton, Ill., assignor to Olin Corporation, New Haven, Conn.

Filed Aug. 19, 1970, Ser. No. 64,983

Int. Cl. B23p *11/00*

U.S. Cl. 29—432 **3 Claims**



A method and apparatus for joining two or more sheets of metal together and the composite metal blank and mechanical joint produced thereby. A punch and die apparatus is employed wherein a slug is extruded from a first sheet and embedded in a hole provided in a second sheet by the punching action of the slug. The punch never contacts the die itself and the resulting joint is between the slug from the first sheet and the second sheet in which it is embedded. The slug formed from the second sheet is sheared from the composite. By performing this operation in opposing corners of the two sheets, the sheets are secured together so as to prevent relative motion between them. The invention is particularly applicable to the formation of composite metal blanks having a pattern of stop-weld material sandwiched between the sheets.

3,729,805

METHOD OF PRODUCING STAINLESS STEEL-LOW CARBON STEEL COMPOSITES

Richard J. Mollica, Jr., Royal Oak; Joseph E. Hunter, Jr., Rochester, and Kenneth R. Bladzik, Plymouth, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

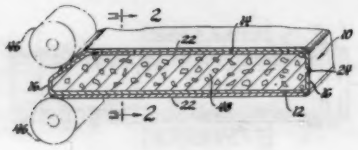
Filed Nov. 8, 1971, Ser. No. 196,528

Int. Cl. B23k *31/02*

U.S. Cl. 29—471.7 **7 Claims**

Stainless steel-low carbon steel composite sheets are prepared by welding a sheet of stainless steel to one side of a sheet of low carbon steel, the carbon steel sheet being preferably in the form of a tray, depositing many small pieces of low carbon steel scrap (offal) on the carbon steel sheet in a thick, porous layer of uniform thickness, heating the welded sheets and scrap particles to a temperature of about 2000° F., and passing them through at least one set of rollers to weld the low carbon steel scrap into a fully densified, solid layer including the carbon steel sheet and to weld the carbon steel layer to

the adjoining stainless steel sheet. The resulting product is a flat-rolled composite sheet wherein the relatively thick low carbon steel portion is simultaneously formed from scrap particles and welded to a thinner stainless steel layer.



3,729,806

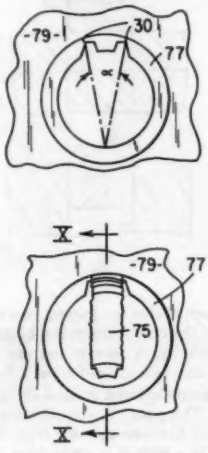
METHOD FOR TUBE REMOVAL

William B. Bronne, and Harley E. Linthicum, both of Springfield, Ohio, assignors to Carrier Corporation, Syracuse, N.Y.

Division of Ser. No. 757,963, Sept. 6, 1968, Pat. No. 3,628,246. This application July 31, 1970, Ser. No. 64,932

Int. Cl. B23p *19/02*

U.S. Cl. 29—427 **1 Claim**



A method and apparatus for relieving the hoop stresses securing a tube in a tube sheet to allow removal of the tube therefrom, the hoop stresses being relieved by removing material from the tube to form two axial slots having a radial depth less than the tube wall thickness and depressing the portion of the tube between the slots to break the portion loose from the remainder of the tube to relieve the hoop stresses therein.

3,729,807

METHOD OF MAKING THERMO-COMPRESSION-BONDED SEMICONDUCTOR DEVICE

Shohei Fujiwara, Takatsuki, Japan, assignor to Matsushita Electronics Corporation, Kadoma, Osaka Prefecture, Japan

Filed Oct. 29, 1971, Ser. No. 193,956

Claims priority, application Japan, Oct. 30, 1970, 45/96128; Nov. 5, 1970, 45/97672; Nov. 5, 1970, 45/97673; Nov. 7, 1970, 45/98605

Int. Cl. B23k *31/02*

U.S. Cl. 29—473.1 **5 Claims**

In making a semiconductor device comprising a die of silicon, germanium or gallium arsenide, the bonding of the die onto a metal header (i.e., holding member) is made firmly without insertion of a conventional thin gold film therebetween, by depositing gold onto the bonding face of a slice, which is to be cut into the die, in such a manner that at least the surface of the deposited layer is gold or an alloy of gold containing small amounts of an additive.

3,729,808

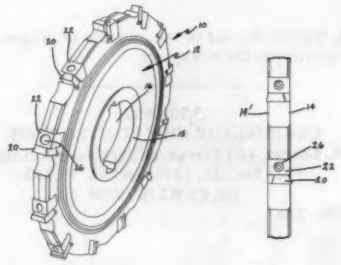
MILLING CUTTER AND APPARATUS

Heinz K. Wolf, and Ralph W. Lacey, both of Farmington, Mich., assignors to Kysor Industrial Corporation, Cadillac, Mich.

Filed July 28, 1971, Ser. No. 166,739

Int. Cl. B26d *1/12*

U.S. Cl. 29—105 R **6 Claims**



This disclosure relates to milling cutter apparatus employing a cutter body with peripheral slots that extend through the body and receive blade inserts retained normal to the cutter body end faces by wedges, the inserts preferably being positioned by a novel magnetically retained hand gauge, with or without a novel supplemental setting stand.

3,729,809

NUT PLATE RIVETING DEVICE

Verne E. Vawter, Bonita, and Richard E. Fernandez, San Diego, both of Calif., assignors to Rohr Industries, Inc., Chula Vista, Calif.

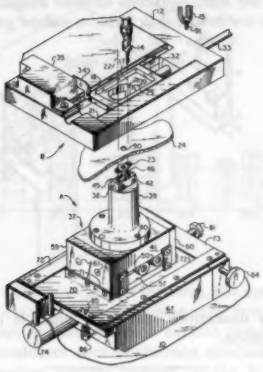
Filed Nov. 22, 1971, Ser. No. 200,953

Int. Cl. B23p *11/00*

U.S. Cl. 29—243.53 **15 Claims**

For use with a rivet setting machine of the type having a single working axis, and which first drills a hole for a rivet on the working axis, and then replaces the drill on the working axis with a rivet inserting and squeezing mechanism, a nut plate having a threaded, screw receiving hole, and two rivet receiving holes is clamped to a workpiece with a pre-drilled hole in the work piece in register with the threaded hole in the nut plate. Two spring biased indexing pins enter, respectively, the two rivet holes in the nut plate to thereby index first rivet hole of the nut plate in the working axis of the rivet setting machine. The rivet setting machine is then actuated in a usual manner to drill a rivet hole in the work piece in register with the first hole in the nut plate and to then insert and squeeze a first rivet therein. The mechanism of the present invention then moves the assembly of nut plate, work piece and indexing pins laterally to index the second indexing pin and rivet hole in the nut plate on said working axis. Thereupon the rivet setting machine drills a second rivet hole in the work piece in register with the second rivet hole in the nut plate, and inserts and squeezes the second rivet to complete the nut plate attaching operation. The rivet setting machine and the mechanism of

the present invention then return to starting position ready to repeat the operation. Means are provided on the mechanism of the present invention to measure and adjust the lateral



movement of the mechanism of the present invention between the first and second drilling and rivet setting operations to conform to the spacing between rivet holes in a nut plate to be attached.

3,729,810

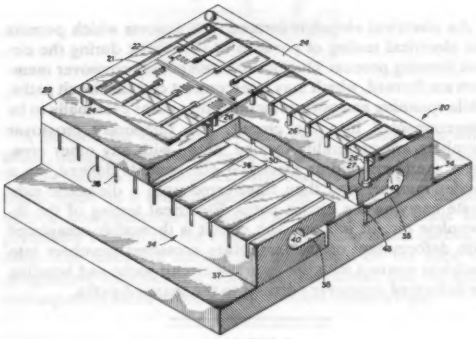
COMPENSATING BASE FOR LEAD-FRAME BONDING

Benjamin Piechocki, Bethelehem, Pa., assignor to Western Electric Company, Incorporated, New York, N.Y.

Filed Dec. 14, 1971, Ser. No. 207,854

Int. Cl. B23k *5/22*

U.S. Cl. 29—493 **2 Claims**



Bonding of lead frames to ceramic substrates is performed on a bonder with a compensating base. The compensating base includes a series of cantilever spring elements attached to a rigid support. The elements are reduced in cross-sectional area near the point of attachment to the rigid support. A free end of eaCh of the spring elements is placed under each point of the substrate to which a lead is to be bonded. The elements accommodate to variations in thickness and waviness of the substrate so that it does not crack during the bonding operation.

3,729,811

METHODS OF MANUFACTURING A SEMICONDUCTOR DEVICE

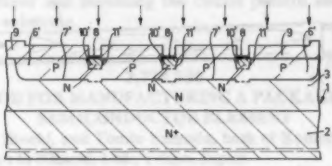
Julian Robert Anthony Beale, Reigate, and John Anthony Kerr, East Grinstead, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 30, 1970, Ser. No. 93,555

Claims priority, application Great Britain, Dec. 1, 1969, 58,514/69

Int. Cl. B01j *17/00*

U.S. Cl. 29—578 **7 Claims**



A method of making a semiconductor device is described which combines ion implantation with another process of forming an impurity-containing semiconductor region. In particular, a surface-adjoining region of a semiconductor is formed in such manner that the portion of that region adjacent the surface is formed by a process other than ion implantation, whereas a surface remote or buried portion of that region which defines a P-N junction is formed by ion implantation. This combination of steps yields improved semiconductor devices.

3,729,812

MANUFACTURE OF THIN-WALLED CONTAINERS

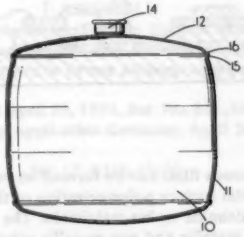
Lindsay Maitland Thomas, Chisworth, England, assignor to Fairey Stainless Limited, Heston, Middlesex, England

Filed Dec. 2, 1971, Ser. No. 204,250

Claims priority, application Great Britain, Dec. 2, 1970, 57,247/70

Int. Cl. B23k *31/02*

U.S. Cl. 29—471.1 **20 Claims**

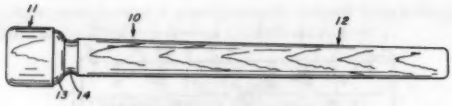


Metal containers, particularly for beer, have been made from stainless steel which is compatable with beer or aluminium which is specially coated to make a compatable inner surface. The stainless steel container is expensive when the wall thickness is such as to withstand rough handling and the cheaper aluminium container has a limited life depending on the internal coating. The present invention provides a double wall container of which the inner wall is of thin stainless steel. The invention solves the hitherto insurmountable problems of forming a thin walled inner vessel and expanding it inside an outer vessel so that the resulting inner vessel is without crevices which would otherwise be extremely difficult to clean to meet strict hygiene regulations.

3,729,813
METHOD OF FORMING AN IMPREGNATED TEXTILE BOBBIN

James W. Marston, and Percy J. Bolton, both of Campton, N.H., assignors to North American Rockwell Corporation, Pittsburgh, Pa.

Filed Jan. 24, 1972, Ser. No. 220,185
Int. Cl. B23p *25/00*
U.S. Cl. 29—527.2 **7 Claims**

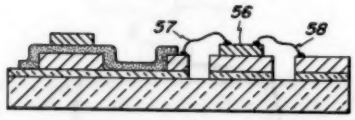


A process for producing textile bobbins having improved performance characteristics and life properties which comprises impregnating a bobbin blank which is at least in part of greater than final dimensions with a selected impregnant that will cure into a hard non-softening wear-resistant surface, curing the impregnant to form the surface aforesaid and subjecting the cured surface to an abrading operation reducing the oversize part of the bobbin to final dimensions.

3,729,814
METHOD FOR MAKING A COMPOSITE

Archibald N. Wright, and Wilfred F. Mathewson, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 872,262, April 1, 1969, Pat. No. 3,619,259, which is a continuation-in-part of Ser. No. 628,447, April 4, 1967, abandoned. This application July 1, 1971, Ser. No. 158,804
Int. Cl. B01j *17/00*
U.S. Cl. 29—577 **5 Claims**



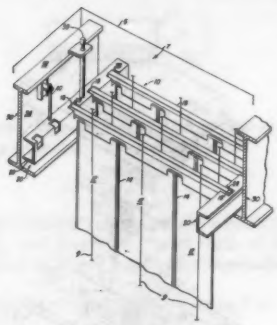
Thin, continuous films can be formed on various substrates by the ultraviolet surface polymerization of the vapor of a N-substituted maleimide or bis-maleimide. The films are useful as coatings on metallic and non-metallic substrates, capacitor dielectrics, insulation for microelectric devices, insulation on electrically conductive wire, and for corrosion protection.

3,729,815
METHOD FOR INSTALLING MULTIPLES OF DUST COLLECTOR PLATES

Bartholomew F. Quintilian, Baltimore, and Robert J. W. Williams, Lutherville, both of Md., assignors to Koppers Company, Inc., Pittsburgh, Pa.

Filed Jan. 25, 1971, Ser. No. 109,323
Int. Cl. H01s *4/00*
U.S. Cl. 29—592 **3 Claims**

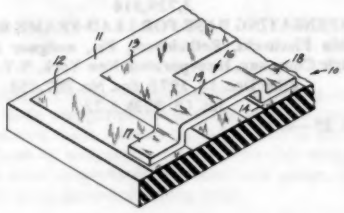
A plurality of dust collector plates are secured together to form a bundle of such plates. The bundle is introduced into the shell of an electrostatic precipitator. Supports are provided within the shell for supporting the secured bundle of plates, prior to installation, and for supporting the plates after the bundle is unsecured and each plate is installed in its respective position.



3,729,816
METHOD OF FORMING A CIRCUIT

John Andrew Burns, New Hope, Pa., assignor to Western Electric Company, Incorporated, New York, N.Y.

Filed Dec. 2, 1971, Ser. No. 203,997
Int. Cl. B01j *17/00*
U.S. Cl. 29—593 **22 Claims**



An electrical circuit is formed by a process which permits the electrical testing of portions of the circuit during the circuit forming process. One or more temporary crossover members are formed, which may interconnect certain circuit paths, while spanning and not contacting other paths eventually to be interconnected into the circuit. The temporary crossover members are preferably formed, along with any other crossover members and/or electrical components desired, on a carrier member and then transferred onto a dielectric substrate carrying the circuit paths. Electrical testing of the incomplete circuit follows. The circuit is thereafter completed with deformation of the temporary crossover members into electrical contact with the spanned circuit paths and bonding the deformed crossover portions to the spanned paths.

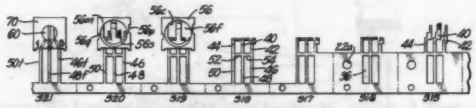
3,729,817
METHOD OF MAKING ROTATABLE ELEMENT POTENTIOMETER

Joseph R. De Rouen, Banning; Kenneth B. Baldwin, Corona, and Henry F. Martin, Rialto, all of Calif., assignors to Bourns, Inc., Riverside, Calif.

Filed Sept. 23, 1971, Ser. No. 182,997
Int. Cl. H01c *17/00*
U.S. Cl. 29—610 **5 Claims**

A method of producing a potentiometer by advancing a long thin sheet of metal progressively through sets of die means at respective stations at which uniformly spaced registry holes are punched, other portions of material are punched out by each of successive die means to remove metal to com-

mence formation of terminal means, an edge portion of the strip is thinned as by spanking to provide for formation of thin work-hardened resilient contact fingers, material removed or formed by additional die means and integral contact leaves and terminals formed, one or more contact members sheared to form at least one multi-finger contact member, the contact members and fingers bent to stand up from the strip, potentiometer housing bodies molded about portions of the strip to



provide a body at each station of the strip, the upstanding contact members cupped to form respective sets of contacts, rotatable ceramic members which cermet resistive elements and slip-ring conductor sectors thereon inserted into respective housing bodies, covers applied to the bodies and ultrasonically sealed thereto, and the terminal means freed by shearing from the strip to separate individual potentiometers from the strip; and the product produced by the process.

3,729,818

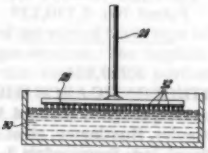
SEMICONDUCTIVE CHIP ATTACHMENT MEANS

Carl E. Bleil, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 874,516, Nov. 6, 1969. This application Oct. 15, 1971, Ser. No. 189,684

Int. Cl. H01r *9/00*

U.S. Cl. 29—630 **1 Claim**



A method for mounting a semiconductive chip on a substrate, using integral leads, and a method for making the leads. The techniques described are particularly useful in making integral leads on a semiconductive chip which can be flipped onto a complementary conductor network. The leads are preferably formed on the chip while the chip is still part of a slice. The leads are simultaneously formed on the slice by progressive solidification from a melt material, and the slice subsequently diced to form the individual leaded chips.

3,729,819

METHOD AND DEVICE FOR FABRICATING PRINTED WIRING OR THE LIKE

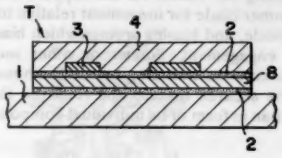
Isao Horie, Chigusa-ku, Nagoya-shi, Japan, assignor to Nippon Toki Kabushiki Kaisha, Nagoya-shi, Aichi-ken, Japan

Filed Jan. 9, 1970, Ser. No. 1,816

Int. Cl. B41m *3/08*; H05k *3/20*

U.S. Cl. 29—625 **8 Claims**

A transfer device comprises a base layer of paper or the like, an adhesive layer attached to said base layer directly or by means of a thin paper, a conductive pattern or circuit element pattern printed on said adhesive layer and, further, a carrier layer over said pattern. Printed wiring, integrated circuits or the like are fabricated by printing a circuit pattern on the base layer and covering same with the carrier layer, removing



the base layer and mounting the circuit pattern and carrier layer on a substrate.

3,729,820

METHOD FOR MANUFACTURING A PACKAGE OF A SEMICONDUCTOR ELEMENT

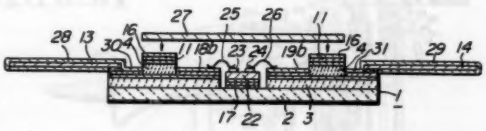
Takahiko Ihochi, and Tomio Yamada, both of Kodaira, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed March 6, 1970, Ser. No. 17,207

Claims priority, application Japan, March 12, 1969, 44/18330

Int. Cl. H05k *3/28*

U.S. Cl. 29—627 **1 Claim**



A method of manufacturing a flat package having a casing for accommodating semiconductor elements, in which a conducting lead is adherent to a portion of a metallized layer leading out from the casing to the surface of the package, and the exposed surface of the metallized layer outside the casing is coated with an alloy layer of lead-tin, thereby preventing the corrosion of the metallized layer.

3,729,821

DRYSHAVER WITH REMOVABLE LONG-HAIR CUTTER ASSEMBLY

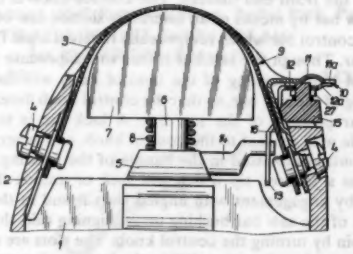
Gunter Voigt, Schonberg, Taunus; Norbert Metzler, Schwalbach, Tanus, and Jurgen Golob, Friedrichsdorf, Tanus, all of Germany, assignors to Braun Aktiengesellschaft, Frankfurt, Germany

Filed April 22, 1971, Ser. No. 136,320

Claims priority, application Germany, April 24, 1970, P 20 19 978.4

Int. Cl. B26b *19/20*

U.S. Cl. 30—34.1 **6 Claims**



A housing of a dryshaver has a short-hair cutter mounted in it. It further comprises a long-hair trimming unit which is con-

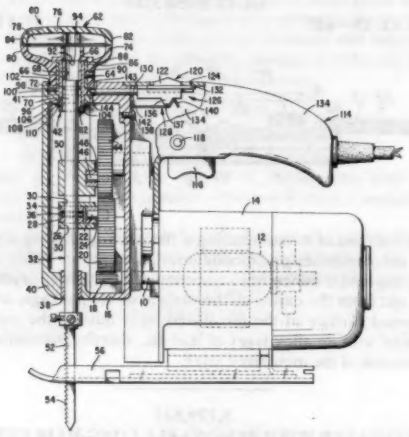
structed as a unitary assembly and includes a support, a stationary and a cooperating movable trimmer blade, mounting means mounting the blades on the support and guiding the movable trimmer blade for movement relative to the stationary trimmer blade, and biasing springs which bias the trimmer blades into engagement. Screws or other securing means detachably secure the trimming unit to the housing means so that it can be secured thereto and removed therefrom as a unit, rather than in form of its individual components.

3,729,822

SABRE SAWS WITH LOCKABLE SWIVEL SAW BARS

William A. Batson, Pickens, S.C., assignor to The Singer Company, New York, N.Y.

Filed March 9, 1972, Ser. No. 233,208
Int. Cl. B27b *19/08*
U.S. Cl. 30—394 **7 Claims**



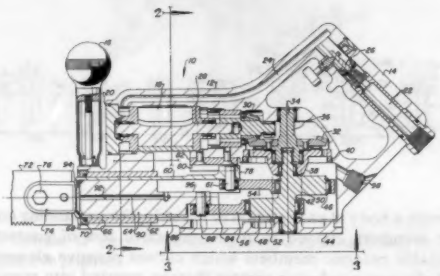
A sabre saw is provided with means for driving the saw bar in a linear reciprocatory motion from a rotary electric motor, while at the same time, permitting the saw bar to be manually rotated or selectively locked in position about its own axis to set the cutting edge of the saw blade in different angularly oblique positions relative to the line of movement of the tool. A control knob is journaled to rotate within the housing, at the top of the front end thereof. The control knob is coupled to the saw bar by means of an internally slotted saw bar bushing in the control bar which reciprocally receives a pin fixed in the saw bar. Though the saw bar is free to reciprocate within the control knob, turning of the control knob will cause a like turning of the saw bar, so that the control knob determines the angular position of the saw bar. A lock pin is transversely slidable with respect to the control knob, and is actuated by a slide button mounted in the handle of the housing. The lock pin has a tapered tip which will lock or unlock the control knob by engagement with angled slots found in the external flange of the saw bar bushing upon aligning said slot with the lock pin by turning the control knob. The slots are set at convenient angles of cutting. When the lock pin is removed from the slots in the flange, the control bar is in an unlocked position and can be manually manipulated so as to suitably position the cutting edge of the saw blade, as in scroll cutting.

3,729,823

RECIPROCATION DRIVE AND COUNTERWEIGHT ARRANGEMENT FOR POWER SAWS

John R. Bos, Grand Haven; Clarence A. Sorensen, Fruitport, and Laurens Van Elzelingen, Grand Haven, all of Mich., assignors to Gardner-Denver Company, Quincy, Ill.

Filed May 5, 1971, Ser. No. 140,391
Int. Cl. B27b *19/04*
U.S. Cl. 30—394 **5 Claims**



A drive arrangement for a portable reciprocating power saw or the like including a crankshaft having a pair of closely spaced opposed crank throws and connecting rods attached to each throw. One connecting rod is connected to a tubular reciprocating blade drive member and the other connecting rod is connected to a cylindrical counterweight slidably housed in telescoping relationship within the tubular blade drive member. The saw blade drive member and counterweight reciprocate in opposite directions along a common axis and the saw blade drive member also serves as a bearing support for the counterweight.

ERRATUM

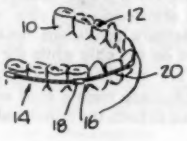
For Class 30—391 see:
Patent No. 3,730,239

3,729,824

ORTHODONTIC ARCH WIRE

Dietrich Baues, Jackson Heights; Richard Marini, Bellerose, and Donald McCauley, Huntington, all of N.Y., assignors to G.A.C. International, Inc., Farmingdale, L.I., N.Y.

Filed Dec. 7, 1970, Ser. No. 95,699
Int. Cl. A61c *7/00*
U.S. Cl. 32—14 A **14 Claims**



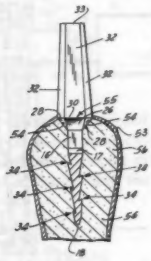
Orthodontic arch wire comprising three segments of wire twisted together to form a single stranded arch wire with turns which have an angle with the longitudinal axis of the wire of sufficient magnitude but less than 90° and which have a sufficient number of turns per inch of length of wire such that the wire has the characteristics that it does not fray when cut and the segments do not separate when bent at an angle of at least 90° and when the ends thereof are flicked repeatedly. The twisted wire is preferably subjected to precipitation hardening at a temperature of from about 950° to about 975° Fahrenheit to increase its tensile strength. Apparatus for twisting the wire comprises a rotatable chuck and a fixed chuck mounted on a

slidable shaft, each chuck having a pair of posts for forming a continuous length of wire into three spaced substantially equal and parallel segments. Affixed to the end of the slidable shaft is a weight for maintaining the parallel segments of wire under substantially constant tension. A set screw engageable with a V slot in the shaft prevents rotation of the shaft during twisting of the wire but permits rotation thereof after completion of twisting to relieve torsional stresses in the wire built up during the twisting operation. A method of forming the arch wire is also disclosed.

3,729,825
ORAL IMPLANT

Leonard I. Linkow, Cedarhurst; Charles M. Weiss; Lillian Bishop Weiss, both of New York, and Abram Liwerant, East Meadow, all of N.Y., assignors to Oratronics, Inc., New York, N.Y.

Filed Aug. 2, 1971, Ser. No. 168,129
Int. Cl. A61c *13/00*
U.S. Cl. 32—10 A **23 Claims**



An oral implant of the vented blade type is disclosed with a series of major improvements. The implant generally comprises a relatively thin vented blade portion adapted to be driven into a groove in the patient's jawbone, a crown supporting head and a neck portion connecting the crown supporting head to the blade portion.

The head is formed in the shape of a truncated pyramid and is provided at its underside with inclined beveled surfaces adapted to securely seat on chamfered surfaces at the mouth of the groove in the ridge crest of the patient's jawbone thereby to provide an automatic limitation on depth of insertion and tremendous increased lateral stability. The head portion is also provided with a plurality of accurately spaced score lines for facilitating measurement of depth of insertion.

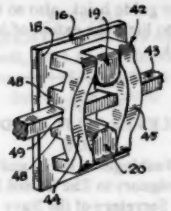
The blade portion may take on a variety of contours designed to conform to various anatomical structures encountered and is preferably provided with a series of bone engaging teeth extending parallel to the sharp blade edge. Various blade contours and tooth profiles are disclosed including a preferred staggered tooth arrangement.

3,729,826
LOCK RING FOR EDGEWISE BRACKET

Peter C. Kesling, Green Acres, La Porte, Ind.

Filed July 16, 1971, Ser. No. 163,313
Int. Cl. A61c *7/00*
U.S. Cl. 32—14 A **20 Claims**

An orthodontic appliance for locking an archwire or archwires to an edgewise orthodontic bracket, and to provide movement control wherein the appliance is in the form of a ring that fits over the projections of the bracket and is locked in place on the projections to lock the archwire in the archwire slot. Lingual extensions may be provided on the ring for engagement with the archwire to provide mesio-distal

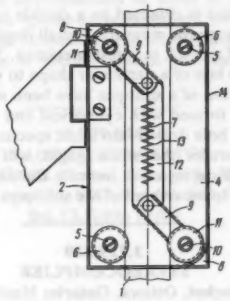


inclination control when using round wire, and additionally labio-lingual control when using rectangular wire.

3,729,827
CARRIAGE FOR DRAWING DEVICES

Evgeny Mikhailovich Perminov, ulitsa Angarskaya 26, Korpus 1, kv. 10, Minsk, U.S.S.R.

Filed July 22, 1970, Ser. No. 57,130
Claims priority, application U.S.S.R., Aug. 14, 1969, 1358219
Int. Cl. B43l *13/02*
U.S. Cl. 33—79 R **2 Claims**



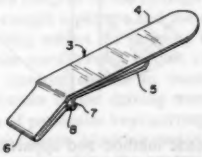
A carriage for use with guide means in drawing devices, in which two carrying rollers are mounted on axles stationarily secured to a base for the carriage, and two pressure rollers are mounted on axles secured to slides.

The slides are disposed in slots provided in the base for the carriage at an angle relative to the longitudinal axis of the carriage and interconnected by means of a resilient member whereby the pressure rollers are constantly urged against the carriage guide means to preclude skewing and playing.

3,729,828
BRICKLAYERS LINE HOLDER

Leo A. McKenzie, 3540 Ridgeway Drive, Bethel Park, Pa.

Filed Oct. 26, 1971, Ser. No. 192,416
Int. Cl. B43l *7/00*; E04g *21/18*
U.S. Cl. 33—86 **3 Claims**



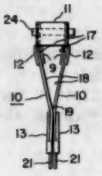
A bricklayer's "trig" for holding intermediate portions of a stretched guide line accurately in place so that intervening

bricks of each course may be laid in proper alignment in the same horizontal and vertical planes. The trig is so shaped as to facilitate insertion of an intermediate portion of the line and for positioning the line to correspond exactly to the height of the top surface of the guide brick, also so that a portion of the trig serves as a stop to limit the extent of insertion beyond the front face of the brick.

3,729,829
DOUBLE CANTILEVER SPLIT-PIN DISPLACEMENT GAGE

Eugene A. Lange, Washington, D.C., and Renald F. Bryner, Oxon Hill, Md., assignors to The United States of America as represented by the Secretary of the Navy

Filed Oct. 22, 1971, Ser. No. 191,697
Int. Cl. G01b 7/16
U.S. Cl. 33—148 D **3 Claims**

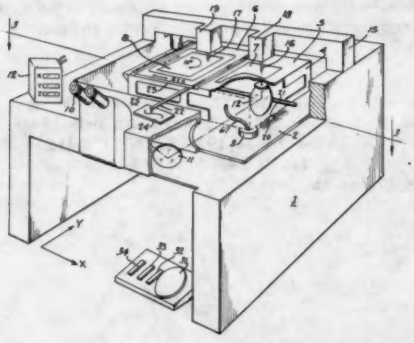


This disclosure is directed to a double cantilever split-pin displacement gage for measuring small displacements such as the opening of a crack in a test specimen. The device is provided with two legs of a particular shape to which strain gages and a half section of a split-pin have been secured. The split-pin halves are formed with cylindrical end probes which are inserted into a hole drilled into a test specimen and as the test specimen separates the strain gages will produce an appropriate electrical signal to indicate the displacement of the separation due to movement of the split-pins in the hole.

3,729,830
STEREOCOMPLIER

Theodore J. Blachut, Ottawa, Ontario; Manfred Paulun, Kirk Ferry, Quebec, both of Canada, and Angel Garcia Amaro, Mexico City, Mexico, assignors to Canadian Patents and Development Limited, Ottawa, Ontario, Canada

Filed Jan. 18, 1971, Ser. No. 106,995
Claims priority, application Canada, Jan. 19, 1970, 072475
Int. Cl. B43l 13/16
U.S. Cl. 33—20 D **13 Claims**

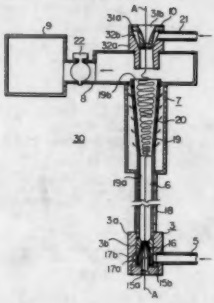


A photogrammetric method and apparatus for the stereoscopic examination and preparation of maps of featured surfaces in which a pair of stereo images is mounted on a carriage and a three dimensional measuring mark can be brought into conjunction with features on the three dimensional optical model produced from the stereo pair. Marking means are provided so that as the measuring mark means and the optical model are moved relatively to one another, drafting can be carried out on one or both of the stereo image pair. The apparatus can also provide for the recording of co-ordinate data of points on the model moved into conjunction with the measuring mark means.

3,729,831
PROCESS AND APPARATUS FOR CONTINUOUSLY RELAXING TEXTILE YARNS

Kenzo Kosaka, Chigusa-ku, Nagoya-shi, Aichi-ken; Kiyoshi Adachi, Moriyam-ku, Nagoya-shi, Aichi-ken; Hiroshi Kitagawa, Moriyama-ku, Nagoya-shi, Aichi-ken; Tunehika Nakamura, Nishi-ku, Nagoya-shi, Aichi-ken, and Osami Kato, Moriyama-ku, Nagoya-shi, Aichi-ken, all of Japan, assignors to Mitsubishi Rayon Company Limited, Tokyo, Japan

Filed Dec. 7, 1971, Ser. No. 205,677
Claims priority, application Japan, Dec. 7, 1970, 45/107935
Int. Cl. F26b 3/10
U.S. Cl. 34—23 **17 Claims**

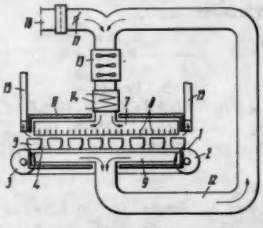


A textile yarn is continuously relaxed during its advance through a relax tube extending along the path of advance of the yarn and an accumulation tube wherein the yarn is accumulated so as to stay therein for a predetermined time by flowing a heating medium through the relax tube and the accumulation tube.

3,729,832
METHOD OF AND APPARATUS FOR DRYING MOTOR COMPRESSORS

Egon Lund, Sonderborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark

Filed May 12, 1971, Ser. No. 142,554
Claims priority, application Germany, May 5, 1970, P 20 21 948.1
Int. Cl. F26b 3/00
U.S. Cl. 34—34 **7 Claims**



The invention relates to a method and apparatus for drying motor compressors of the type having a semispherically

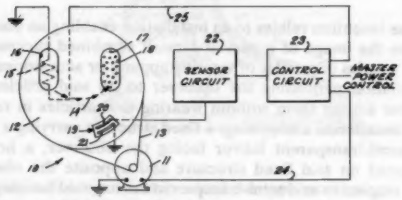
shaped casing with a motor compressor unit mounted in the casing. The drying object is achieved by introducing, under pressure, a directed stream (or streams) of a gaseous drying medium into the gap between the wall of the case and the motor compressor unit at several peripheral points and the internal curvature of the casing causes the streams to respectively leave the gap at other peripheral points.

3,729,833

DRYNESS SENSOR CIRCUIT WITH STATIC ELIMINATING MEANS FOR DRYER

Donald E. Janke, Benton Harbor, and Roque D. Marcade, Stevensville, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Nov. 12, 1971, Ser. No. 198,352
Int. Cl. F26b *21/00*
U.S. Cl. 34—48 **7 Claims**



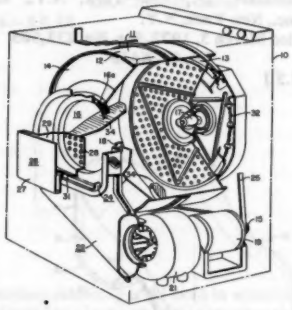
A static suppression circuit is provided for a dryness sensor of a clothes dryer wherein the sensing electrodes of the sensor circuit have connected thereto circuit means which function as a charge source and a charge sink for respective opposite polarities of static signals.

3,729,834

LAUNDRY DRYER WITH OBLIQUE TUMBLING VANES

John J. Fox, Lexington, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed April 23, 1971, Ser. No. 136,703
Int. Cl. F26b *11/02*
U.S. Cl. 34—139 **7 Claims**



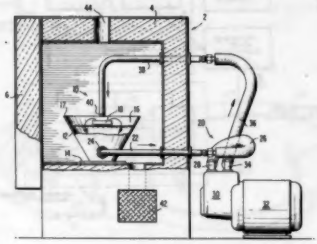
A laundry dryer is provided having three tumbling vanes generally equidistantly disposed on the internal cylindrical wall of the dryer drum. The vanes are oriented such that they intersect a straight line generatrix of the cylindrical surface of the drum at an angle of approximately 30°, with one of the vanes pivoted about its point of intersection in a direction opposite the two remaining vanes. The vanes in cross-section are generally V-shaped with each leg of the V lying adjacent the internal cylindrical wall of the drum, while the apex of the V is generally rounded and forms an upper surface along the length of the blade. The height of the upper surface is tapered from a maximum at generally the mid-point to a minimum at the trailing end of the vane determined with respect to the direction of rotation of the drum.

3,729,835

SPECIMEN DRYING APPARATUS

Franklin Louis Massett, 5261 Algiers Drive, Memphis, Tenn.

Filed June 1, 1971, Ser. No. 148,377
Int. Cl. F26b *19/00*
U.S. Cl. 34—225 **1 Claim**



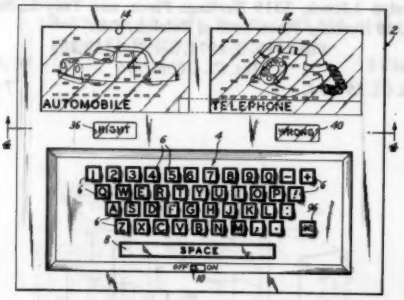
For quantitative determination of water in a specimen of known weight, the specimen is supported in an oven in a manner that air can circulate freely around it. A high velocity stream of hot air is blasted against the sample until the specimen is dried.

3,729,836

TEACHING APPARATUS

Wataru Mayeda, 1106 S. Wester, Champaign, Ill.

Filed April 10, 1967, Ser. No. 629,716
Int. Cl. G09b *13/00*
U.S. Cl. 35—6 **11 Claims**



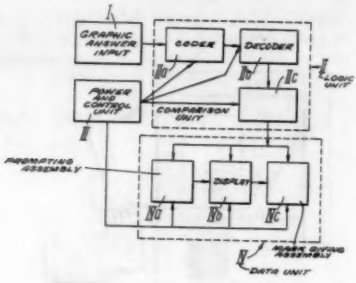
A teaching apparatus having a keyboard, each key of which closes a switch; and cards to be fed through the machine, each card having for example a picture and the name of the article depicted, and driving means for stepping the card through a control station, the card having circuit conditioning means operable at the control station to successively condition predetermined circuits to the driving means for completion only by actuation of particular keys corresponding to the successive letters of the name. Masking means conceal those portions of the name approaching the control station and operation of a correct key causes the card to advance one step. The keys must be operated in proper sequence to correctly spell the name and thus advance the card through the machine.

3,729,837

GRAPHICS TEACHING MACHINE

Igor Rafailovich Tarnopolsky, ulitsa Zavooskaya 33, kv. 27, and Gennady Vasilievich Akimtsev, ulitsa Furmanova 23, both of Frunze, U.S.S.R.

Filed Feb. 23, 1972, Ser. No. 228,703
Int. Cl. G09b 7/00
U.S. Cl. 35—9 R 4 Claims



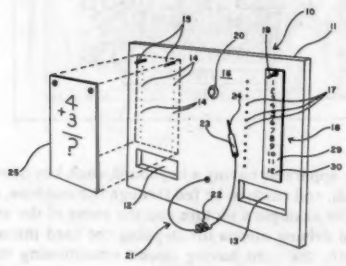
A graphics teaching machine for teaching a student includes: a graphic answer input device, a logic unit and a data unit interconnected in series, as well as a control unit connected to the logic and data units. The logic unit in turn comprises a coder, a decoder and a comparison assembly interconnected in series, while the data unit comprises a "prompting" assembly, a display and a mark-giving assembly interconnected in series, the input of each of these assemblies being connected to the output of the comparison assembly. The decoder uses an AND-circuit that operates in case the student gives a correct answer, and a delay element resetting this circuit to its original state with certain time delays after its operation.

3,729,838

EDUCATIONAL AND RECREATIONAL DEVICE

Carolyn Adcock, 3319 Heritage Place, and Troy L. Stewart, 3320 Heritage Place, both of Raleigh, N.C.

Filed Feb. 3, 1971, Ser. No. 112,264
Int. Cl. G09b 7/06
U.S. Cl. 35—9 C 7 Claims



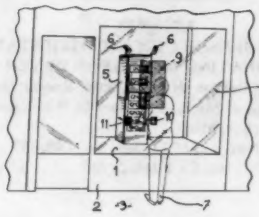
In abstract, a preferred embodiment of this invention is a programmable, comparative response system in the form of an electrically conductive question card and a matched answer card adjacent contact circuit terminals. This system can be used as a teaching aid, a learning aid or a recreational device.

3,729,839

INSTALLATION FOR TRYING ON WEARING APPAREL AND ACCESSORIES

Jean-Claude Bourdier, 22 bis rue Jouffroy, Paris, France

Filed Dec. 30, 1971, Ser. No. 213,969
Int. Cl. G09b 25/00
U.S. Cl. 35—58 16 Claims



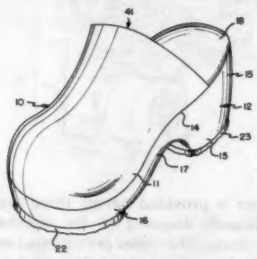
The invention relates to an installation enabling an observer to see the image of a part of himself combined successively with a series of articles of wearing apparel or accessories, said installation permitting the observer to try said articles and choose among them without wearing said articles in reality, said installation comprising: a fixed structure carrying a vertical semi-transparent mirror facing the observer, a housing mounted on said fixed structure and opposite the observer with respect to said semi-transparent mirror, said housing having an opened front wall, a sighting frame slidably mounted on said opened front wall of said housing and arranged to be adjustably displaced on a vertical place, said frame having a window equipped with a guide mark intended to be placed on a level with said part of the observer, and a movable support mounted into said housing at the rear of said sighting frame, said movable support, on which is placed a succession of articles, being actuated by a driving system which causes the articles to appear successively one at a time behind the window of the sighting frame. The invention is applicable, for example, for displaying real articles, such as spectacles, wigs, etc. and in this case, the installation is disposed in the show window of a store.

3,729,840

BACKLESS CLOG CONSTRUCTION

Joseph P. Famolare, Jr., New York, N.Y., assignor to Famolare, Inc., New York, N.Y.

Filed March 3, 1972, Ser. No. 231,505
Int. Cl. A43b
U.S. Cl. 36—2.5 J 21 Claims



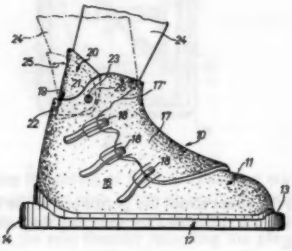
A comfortable, backless clog having a specially shaped rigid upper and a rigid lower is disclosed herein. The clog is held comfortably and snugly to the foot of the wearer by a unique arrangement including a foam lining which cooperates with the rigid upper and lower to define a "keyhole" opening into which the skewed foot of the user may be inserted and then rotated to lock the foot securely in the clog. The clog may be

made from wood or plastic and provides a new shoe construction having the appearance of so-called "wooden" shoes, or "Dutch" shoes.

3,729,841
SKIBOOT

Friedrich Wagner, Rheinstrasse 68, Darmstadt, Germany

Filed March 22, 1971, Ser. No. 126,403
Claims priority, application Switzerland, April 2, 1970, 4925/70
Int. Cl. A43b
U.S. Cl. 36—2.5 AL **15 Claims**

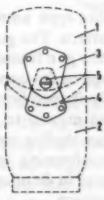


There is disclosed a skiboot of the type possessing a one-piece upper extending at least to the height of the ankle of the user and formed of a flexurally stiff material. According to the invention, the rear portion of the upper edge of the upper is bridged by a flap member destined to flatly bear against the leg of the user, this flap member is pivotably secured to the upper, so that it can pivot about a pivot axis extending transversely with respect to the lengthwise direction of the boot and parallel to the plane of the sole of the boot.

3,729,842
SKI BOOT

Werner Stelzer, Tuttlingen, Germany, assignor to Messrs. Dr. Justus Ricker & Co., Tuttlingen, Germany

Filed Nov. 9, 1971, Ser. No. 196,957
Claims priority, application Germany, Dec. 1, 1970, P 20 58 969.9
Int. Cl. A43b *00/00*
U.S. Cl. 36—2.5 AL **8 Claims**



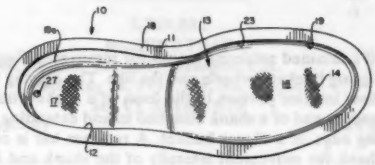
The invention relates to a ski boot in which the neck of the upper is adapted to pivot or bend, in relation to the lower part of the upper about a transverse axis located approximately ankle height, and in which a supporting connection restricted the pivoting motion of the neck is provided between the lower part of the upper and the neck of the upper.

In order to provide, for a ski boot of this kind, a supporting connection which is simple, and therefore inexpensive, permits simple adjustment of the pivoting range, and adapts itself unobtrusively to the line of the ski boot, the invention proposes that plates be attached to the neck and the lower part of the upper, the said plates at least partly covering each other, and being connected together by means of a pin element, the shank of the said pin element exhibiting, in the vicinity of one of the holes in the plates through which it passes, at least two stop surfaces located at different distances from the centerline of the shank of the pin, the position of the said stop surfaces being variable in relation to the relevant hole.

3,729,843
SOFT-SOLED FOOTWEAR

David Greenblatt, 135 Redwood Drive, Roslyn, N.Y., and Allan Greenblatt, 5 Hickory Dr., Great Neck, N.Y.

Filed May 26, 1971, Ser. No. 146,885
Int. Cl. A43b *1/10*
U.S. Cl. 36—4 **11 Claims**

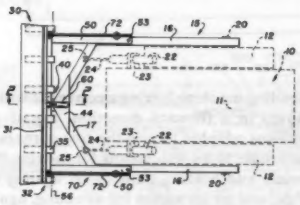


An article of footwear and method and apparatus for making the same are disclosed. The footwear article consists of a unitary upper and an integral one-piece bottom, substantially the same thickness as the upper and preferably formed of injected molded thermoplastic composition. The bottom is provided with an integral upwardly extending peripheral sidewall portion overlying and bonded to a lower portion of the upper. The sidewall portion has an outer surface merging substantially continuously in rounded manner into the tread surface of the bottom. The mold assembly consists of a one-piece cavity mold having an inwardly directed edge formed along at least a portion of the outer periphery of the cavity.

3,729,844
MULTI-PURPOSE BULLDOZER BLADE

Helmut W. Deglan, 10443-70th Avenue R.R. No. 4, Langley, B.C., Canada

Filed March 11, 1971, Ser. No. 123,355
Int. Cl. E02f *3/76*; **A01b** *63/00*
U.S. Cl. 37—117.5 **3 Claims**



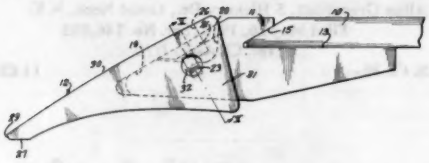
An implement is provided for attachment to the front of an earth moving machine and is supported for rocking movement about a transverse axis and is vertically movable between a substantially ground level position and an elevated position about the machine. The arrangement enables the implement to function as a bulldozer blade, a scraper blade, or a loader bucket. Digging teeth are provided on the implement and a removable plate normally covers the teeth.

3,729,845

SELF CONTAINED RETAINING MEANS FOR REMOVABLE DIGGING TOOTH

James S. Flippin, Aurora, Ill., assignor to Barber-Greene Company, Aurora, Ill.

Filed March 1, 1971, Ser. No. 119,533
Int. Cl. E02f 9/28
U.S. Cl. 37—142 A **4 Claims**



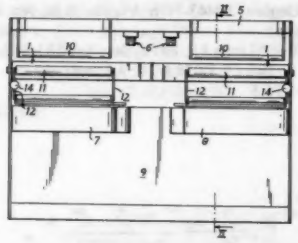
Self contained retaining means for removable digging teeth for digging buckets, wheels and the like. The digging tooth has a hollow interior portion in the form of a socket fitting along the leading end of a shank attached to and extending from the leading edge of a digger bucket. A retainer bar is carried by the shank for movement laterally of the shank and is held in position by a rubber insert in the bar and is retained to the shank when in its locked and release positions. The retainer bar has an upwardly opening slot positionable to register with a projection extending from the digger tooth into the socket. Access to the retainer bar for moving the bar into its locking and releasing positions is provided through the side walls of the tooth, to accommodate movement of the bar to position the slot into and out of alignment with the projection to release or hold the tooth to the shank.

3,729,846

LAUNDRY FEEDING MACHINE

Henry John Weir, Dublin, Ireland, assignor to McGraw-Edison Company, Elgin, Ill.

Filed April 30, 1971, Ser. No. 139,026
Int. Cl. D06f 67/04
U.S. Cl. 38—143 **10 Claims**



A laundry feeding machine having a conveyor with an upper run which moves in a forward direction, a pair of clamps above the conveyor adapted to grip the tow corners of a leading edge of an article to be fed, means for moving the clamps apart transversely and holding them apart against tension in the leading edge, and air jet means for directing, against an article so held, a forward blast of air such that on release by the clamps the leading part of the article is blown forward on to the conveyor.

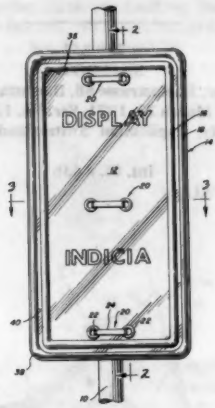
3,729,847

INFLATABLE DISPLAY BANNER

Laurence R. Chandos, Riverside, Ill., assignor to G. B. Frank Incorporated

Filed Dec. 14, 1970, Ser. No. 97,620
Int. Cl. G09f 7/18
U.S. Cl. 40—125 F **1 Claim**

An inflatable display banner that may be collapsed for storage and/or shipment and inflated to display advertising indicia or the like. The banner is comprised of a flexible sheet adapted to receive indicia and a flexible, inflatable tube



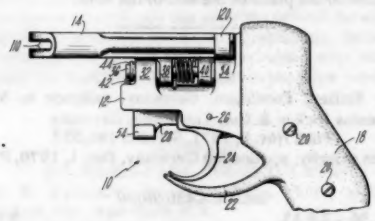
secured to the sheet about the periphery of the latter. Securing elements are also provided for securing the inflated banner to a standard.

3,729,848

HAND GUN AND AMMUNITION THEREFOR

Gary Wilhelm, 55 Kelly Road, Hamden, Conn., and Mark C. Yellin, 46 Fulton Pl., West Hartford, Conn.

Filed Sept. 17, 1970, Ser. No. 73,047
Int. Cl. F41c 9/00, 21/00; F42b 7/04
U.S. Cl. 42—13 **22 Claims**



A hand gun and a shot-type ammunition cartridge which provides a linear shot pattern. The gun includes a barrel which is pivotally mounted to the gun frame to fold the barrel against the frame for easy storage or for concealment under clothing. The barrel has a specially shaped bore which is oblong in cross section and a fan-shaped muzzle to provide a planar field of fire when a shot-type gun shell is employed. A shell having a special configuration conforming to the shape of the bore cooperates with the barrel in developing an even distribution of shot in a linear shot pattern.

ERRATUM

For Class 42—65 see:
Patent No. 3,729,853

3,729,849

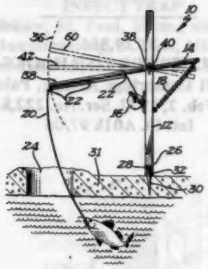
ICE FISHING APPARATUS FOR SIGNALLING THE BITING OF A FISH

David D. Richard, 4944 Welcome Avenue North, Crystal, Minn.

Filed March 4, 1971, Ser. No. 120,812
Int. Cl. A01k 97/12
U.S. Cl. 43—17 **1 Claim**

An ice fishing apparatus for signaling the biting of a fish, including an upright post with a pole pivotally mounted thereto

and extending therefrom, the pole retained in an equilibrium position by a spring extending between post and pole. A fishing reel is mounted on the apparatus, and fishing line stored thereon passes along the pole and downward into an ice hole. The tugging of a biting fish causes the spring supported pole to oscillate about the equilibrium position along a path thereby



visually signalling the biting of the fish. The reel may be positioned on the post in the path of the pivotally mounted pole so that a strong tug on the line causes the pole to swing toward and bear against the reel thereby retarding the playing out of fishing line by in creasing the drag on the line. When the equilibrium position of the pole is horizontal, the pole is substantially unaffected by wind forces acting thereon, assuring that the fisherman is not falsely signalled by pole oscillation generated by the wind.

3,729,850
FISHING LURE
John E. Waters, Jr., 1620 West Collins, Orange, Calif.
Filed March 15, 1971, Ser. No. 124,112
Int. Cl. A01k *85/00*
U.S. Cl. 43—42.37 **10 Claims**

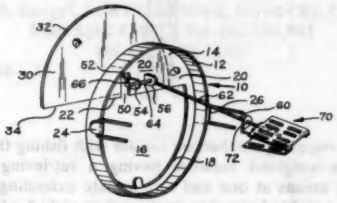
A fishing lure of the jig class in which the jig body is weighted, which includes a resilient vane arranged uprightly in a transverse plane behind the jig body and forwardly of the barb, and in which the fishing line attachment point lies above the center of gravity of the lure approximately over its center of gravity to the end that the lure exhibits oscillatory motion rotationally about the hook shank as the lure is drawn through the water. A number of constructional features account for that kind of motion over a wide range of lure velocities. These features include the use of a jig body which is circular in cross-section, a design which is symmetrical about a vertical mid-plane and the use of prescribed dimensional ratios in the several parts.

3,729,851
LIVE SHRIMP SECURING FISHING LURE
Gilbert C. Garcia, 163 Tabard Drive, San Antonio, Tex.
Filed Aug. 25, 1971, Ser. No. 174,819
Int. Cl. A01k *83/06*
U.S. Cl. 43—44.8 **9 Claims**

A combined fish hook live shrimp holding device primarily designed as a salt water fishing lure. The device employs a long shank double or treble hook to which is secured adjacent the bight of the hook a shell grasping member. The device is

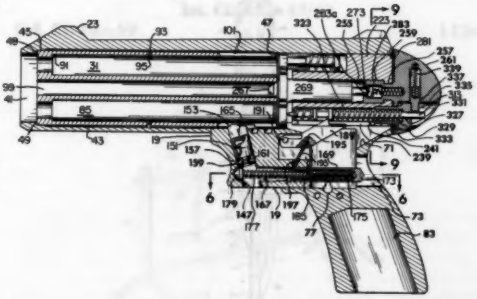
further attached to the shrimp by means of a shrimp horn ring that is secured in position by either spring loading or friction or a combination of both.

3,729,852
RODENT TRAP
Stannard D. Holmes, Box 331, Naranjito, P.R.
Filed May 14, 1971, Ser. No. 143,442
Int. Cl. A01m *23/18*
U.S. Cl. 43—61 **4 Claims**



An apparatus is provided which is attached to the open end of a container such as an empty tin can to provide a rodent trap. The apparatus comprises a cover having an opening and a closure for the opening which is releasably held in open position on the container by a latch having a release mechanism within the container. When a rodent enters the container it pulls a bait holder tripping the release mechanism, and causing the cover to be moved to a position closing the opening.

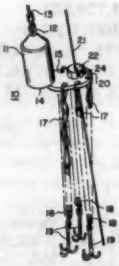
3,729,853
UNDERWATER PISTOL
John L. Critcher, Cockeysville, Md., assignor to AAI Corporation, Cockeysville, Md.
Filed Nov. 24, 1967, Ser. No. 688,647
Int. Cl. F41c *1/00, 19/00, 17/00*
U.S. Cl. 42—65 **12 Claims**



A pistol is disclosed which is suitable for underwater use and adapted to fire a cylindrical cartridge with laterally opposite notches formed therein. The cartridges are inserted into a plurality of circumferentially-disposed cartridge-receiving

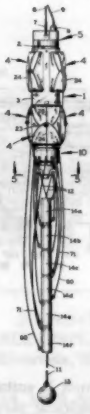
chambers formed in a cylindrical magazine having an annular slot extending radially into the chambers with a snap retaining ring disposed therein and engaging the notched portion of the cartridges to retain them in the magazine. The cylinder magazine is inserted into a magazine chamber portion formed in the pistol barrel through a longitudinaliy extending lateral opening.

3,729,854
LURE RELEASING DEVICE
Kauko K. Satama, Post Office Box 1222, Apache Junction, Ariz.
Filed May 10, 1971, Ser. No. 141,834
Int. Cl. A01k 97/00
U.S. Cl. 43—17.2 6 Claims



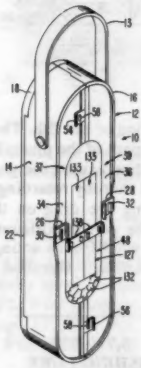
A lure releasing mechanism for use with fishing tackle employing a weighted member having a retrieving line attachment means at one end and a plate extending laterally from the weighted member at the other end. A plurality of chains are suspended from the plate with each chain provided with a hook. The plate has a slot for receiving the fishing line and includes means for detachably holding the fishing line therein. The mechanism is lowered along the fishing line to a snagged lure whereby a hook grabs the lure and disengages it from the obstacle when a pull is imposed on the retrieving line.

3,729,855
APPARATUS FOR SEQUENTIALLY DEPLOYING SPECIMEN COLLECTORS AT SELECTED DEPTHS IN A BODY OF WATER
Shale J. Niskin, 9400 S. W. 63 Court, Miami, Fla.
Filed Dec. 9, 1971, Ser. No. 206,365
Int. Cl. A01k 73/02
U.S. Cl. 43—8 6 Claims



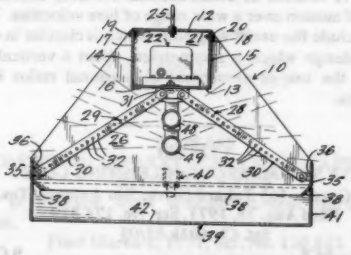
An oceanographic apparatus adapted to be submerged from a craft in a body of water by an end weighted cable for retaining a plurality of compacted specimen collectors for sequential release by remote electric control from the surface craft to descend along the cable to a plurality of predetermined distances for electric deployment for each specimen collector at a predetermined depth when the cable and collectors are towed by a craft or held in a current including automatic means for closing each collector to retain collected specimens therein prior to retraction to the surface by the cable.

3,729,856
HOLDER FOR FISH HOOKS
Ludwik Ziemba, 441 Cambridge Avenue, Palo Alto, Calif.
Filed Feb. 2, 1972, Ser. No. 222,812
Int. Cl. A01k 97/06
U.S. Cl. 43—57.5 R 14 Claims



Apparatus for holding a plurality of fish hooks having leaders attached thereto wherein the apparatus includes a pair of hook-holding sections, one section having a central recess for receiving the other sections. Each section has a number of hook mounts for releasably holding fish hooks in fixed positions and means for keeping the leaders of the hooks separated from each other. Each mount includes a base pivotally mounted on a support and a flexible extension rigid to the base and provided with a free outer end for engaging the barb of a fish hook while the remainder of the extension conforms to the shank of the hook. The two sections are disposed in a shell which can be opened to permit access to the outer section, the latter being separated into two parts to permit it to swing away from the inner section and thereby allow access to the latter.

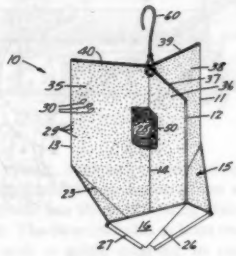
3,729,857
INSECT ELECTROCUTOR
Frank L. Giordano, Stone Mountain, Ga., assignor to Insect-O-Cutor, Inc., Stone Mountain, Ga.
Filed Feb. 23, 1971, Ser. No. 117,944
Int. Cl. A01m 1/22
U.S. Cl. 43—112 8 Claims



The disclosure relates to a flying insect electrocutor including a pair of spaced side panels, and two bottom supports

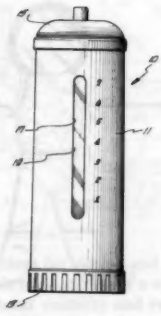
spaced below the housing and also extending between the side panels. A pair of planar electric grids are positioned between the side panels. The grids diverge outwardly in a downward direction. Black light lamps are positioned within the grids to attract the insects. A collection tray is removably positioned beneath the grids.

3,729,858
INSECT TRAP
Thomas I. Bradshaw, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing, St. Paul, Minn.
Filed June 15, 1971, Ser. No. 153,223
Int. Cl. A01m *1/14*
U.S. Cl. 43—114 **4 Claims**



A disposable, collapsible, water-resistant insect trap having a high degree of structural stability comprising a suitable flexible material folded into a structure having at least three projecting surfaces radially extending from a central axis and connected at one end by inwardly canted connecting members defining a containing area between said members and said surfaces, thereby exposing a relatively large exposed contact surface area which optionally has thereon an insect attractant and a tacky material to hold insects on said trap after they are attracted thereto.

3,729,859
GURGLING BABY BOTTLE
Jay Smith, III, Pacific Palisades; Gerald W. Schmidt, Woodland Hills, and Lawrence T. Jones, Pacific Palisades, all of Calif., assignors to California R & D Center, Pacific Palisades, Calif.
Filed Jan. 11, 1972, Ser. No. 216,996
Int. Cl. A63h *33/00*
U.S. Cl. 46—1 D **10 Claims**

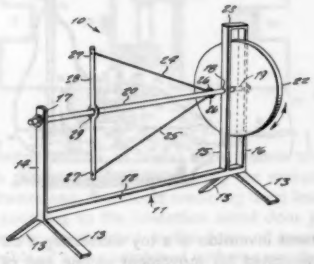


A toy baby bottle is disclosed which produces a simulated gurgling sound of an emptying bottle and a visual simulation of a lowering liquid level as the bottle empties. The bottle comprises a cylindrical housing having a base plate mounted at the lower end and a nipple cover mounted on the upper end. A shaft is concentrically located within the housing and extends along the entire length thereof. A vibrating hammer is mounted on the shaft and is axially movable thereon. The hammer comprises a sleeve having a bore formed therein for receiving the shaft. The bore is dimensioned slightly larger than the diameter of the shaft to enable the sleeve to wobble as it slides down the shaft toward the nipple during the inversion of the baby bottle. The hammer further includes a flexible arm extending radially outward from the sleeve with the extremity of the arm having a weighted element mounted thereon. A disc is also mounted on the shaft and is adapted to follow the hammer in its downward travel during the inversion of the baby bottle. The weighted element and arm assembly functions to vibrate as the sleeve is wobbling down the shaft and strike the speaker disc to produce the simulated gurgling sound. The disc is preferably made of rigid styrofoam and the bottom surface coated with aluminum foil to form a reflecting surface. The base plate includes a plurality of apertures formed thereon for admitting light and sound. The light reflecting onto the surface of the disc is emitted through a pair of translucent windows formed in the sides of the housing to simulate the varying liquid level of an emptying bottle.

3,729,860
CENTRIFUGALLY EXPANSIBLE HULA HOOP
Aloysius S. Kargul, 24 Williams Street, Jewett City, Conn.
Filed April 4, 1972, Ser. No. 240,941
Int. Cl. A63h *33/02*
U.S. Cl. 46—47 **6 Claims**

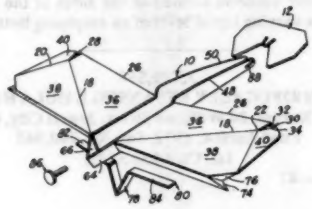
A circumferentially curved member has its one end portion slidably telescoped in its other end portion and thus forms a closed annulus, the telescoped end portions being relatively slidable with sufficient freedom to permit diametric expansion of the annulus by centrifugal force when the hoop is gyrated by the body of a user. The annulus remains in its expanded position to show its enlargement, more-or-less in relation to the gyrating effort involved in expanding the same.

3,729,861
MECHANICAL TOY WHEEL
Jack Lemoine, Simmesport, La.
Filed Sept. 20, 1971, Ser. No. 181,833
Int. Cl. A63h *33/40*
U.S. Cl. 46—59 **1 Claim**



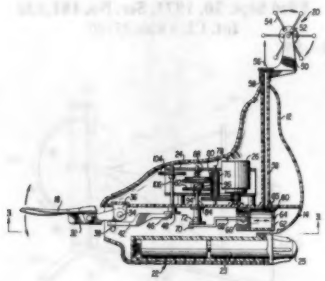
ing a horizontal, freely rotatable shaft upon which there is rigidly attached a wheel or fly wheel, a pair of strings being attached to diametrically opposite sides of the shaft, the opposite ends of the strings each being attached to one end of a pull and recoil bar having a transverse central opening there through so to be fitted upon the shaft so that when the wheel and shaft are rotated, the strings wind up upon the shaft after which subsequently a pull of the bar along the axis of the shaft causes the shaft and wheel to rotate in an opposite direction, the device thus winding up the strings in the opposite direction so that the toy can be continued to operate with the wheel and shaft alternately rotating in opposite directions.

3,729,862
TOY GLIDER
Richard S. Halsey, 2593 Riggs Drive, East Point, Ga.
Filed April 4, 1972, Ser. No. 240,944
Int. Cl. A63h *27/00*
U.S. Cl. 46—79 **10 Claims**



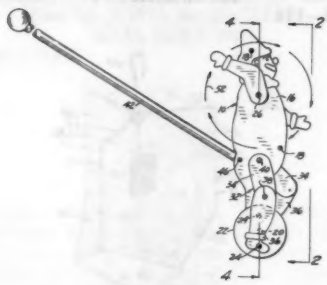
A toy glider having an improved form of wing construction is disclosed. The glider is made from initially flat sheet stock which is expanded polystyrene. In one embodiment the body and are integral while in another the body and wing are separate. In each case the semispans of the wing are provided with score lines and V-notches and when in operative form, the edges of the V-notches are held together so as to give washout twist to the semispans. A shape-holding, rigidifying and balance-providing metal strip is employed, being positioned between folded-over strips along the leading edges of the semispans and the body, and the overlying portions thereof.

3,729,863
TOY SEAL AMUSEMENT DEVICE
Kiyozi Asano, Sumida-ku, Tokyo, Japan, assignor to Shinsei Kogyo C., Ltd., Tokyo, Japan
Filed March 1, 1972, Ser. No. 230,849
Int. Cl. A63h *23/10*
U.S. Cl. 46—92 **5 Claims**



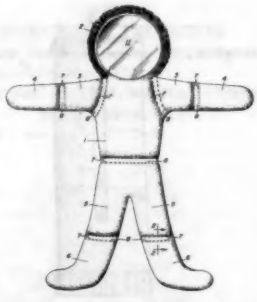
The present invention is a toy simulating a circus seal. A flipper is mounted for movement at one end of the casing which is configured as the seal while a moving wheel is positioned adjacent the seal's mouth. A conduit passes downwardly from the seal's mouth to a pump located within the bottom of the casing. A miniature electric motor powered by batteries is located within the bottom of the casing and is operatively connected to a gear train which sequentially drives the flipper propelling the seal and operates the pump propelling water through the seals's mouth to turn the wheel.

3,729,864
ANIMATED PUSH TOY
Joseph E. Welk, 6085 Chopin, Detroit, Mich.
Filed May 18, 1972, Ser. No. 254,699
Int. Cl. A63h *13/02*
U.S. Cl. 46—105 **2 Claims**



An animated push toy, consisting of an elongated hollow member shaped to resemble a human body, and supported on a wheeled axle. Articulated leg members, pivotally attached to the elongated hollow member, are connected to the wheels by pintles disposed from each other by 180° so as to simulate a pedaling action as the wheels are turned by pushing the toy. Oppositely disposed arms are fixed on a driven shaft rotatably supported in the upper portion of the elongated hollow member. An endless belt in the elongated hollow member drivably connects the drive axle and the driven shaft so as to actuate the arm members as the toy is being pushed on a bearing surface by means of a rod attached to the elongated hollow member.

3,729,865
STUFFED, JOINTED DOLL WITH MIRROR FACE
Geraldine R. Naunheim, St. Louis, Mo., assignor to ME Company, St. Louis, Mo.
Filed Feb. 4, 1971, Ser. No. 112,753
Int. Cl. A63h *3/02*, *3/36*
U.S. Cl. 46—116 **4 Claims**



A doll or doll-like container, particularly of the rag doll type, having a mirrored face and jointed appendages, the joints for the appendages being formed by gaps in the filler at location of the joints.

3,729,866

TOY RAILROAD VEHICLE AND SWITCHING SECTION

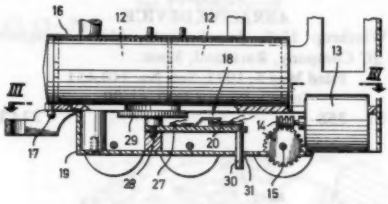
Edwin Faller, and Hermann Faller, both of 7741 Gutenbach, Black Forest, Germany, assignors to Gebr. Faller GmbH Fabrik feiner Modellspielwaren, Black Forest, Germany

Filed Oct. 18, 1971, Ser. No. 190,124

Claims priority, application Germany, Oct. 20, 1970, P 20 51 343.3; July 23, 1971, P 21 36 808.1

Int. Cl. A63h *19/12*

U.S. Cl. 46—216 16 Claims



A toy vehicle system, such as a battery powered toy railway, comprises a vehicle adapted to run on a base which guides the vehicle. The vehicle has three travelling states, viz. forward, stop and reverse. The base includes at least one switching section provided with a guide adapted to cooperate with a switching element on the vehicle when the vehicle enters said switching section from either direction. The guide may be set for travel in a selected direction or "stop" and thereby changes over the switching element to correspond to the desired setting unless the switching element is already at that setting when the vehicle enters the switching section. The guide may be movable by means of a lever between three transverse positions corresponding to the three settings, or may be movable between only two of these settings or may have a fixed setting.

3,729,867

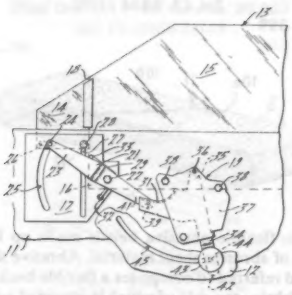
VEHICLE WINDOW SYSTEM

John A. Boschen, Royal Oak, Mich., and Reid E. Francis, Dearborn, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Sept. 13, 1971, Ser. No. 179,894

Int. Cl. E05f *11/38*

U.S. Cl. 49—98 4 Claims



A vehicle window system for raising and lowering in a window opening in a vehicle body structure a window panel vertically divided into coplanar visibility and ventilation sections. The system includes a window regulator mechanism for vertically moving the ventilation section of the window panel relatively to its visibility section. The window regulator mechanism is characterized in that it comprises a guide bracket supported on the visibility section for directing movement of the ventilation section, arm means carried by the guide bracket supporting and controlling the movement of the ventilation panel and biasing means normally urging the arm means and, therefore, the ventilation section in a direction of vertical displacement relative to the visibility section. Movement of the ventilation section relative to the visibility section is controlled by a cam member carried on a vehicle body panel. The vehicle body panel forms one wall of the window well receiving the window panel in lowered position.

3,729,868

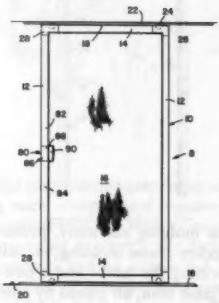
FRAME CONNECTING PIECE

Harold J. Burum, 2411 Sellers Way, Box 156, Sacramento, Calif.

Filed Nov. 25, 1970, Ser. No. 92,757

Int. Cl. E05d *13/02*

U.S. Cl. 49—420 1 Claim



A connector for door frames and the like defined by perpendicular stiles and rails and disposed at corners between them. A central portion of the connector flush with the exterior of the adjacent stiles and rails. Connector extensions are disposed interiorly of the stiles and rails and frictionally connect the stiles and rails to each other to form a rigid door frame. Connecting members are also disclosed which can be placed between aligned sections of a stile or a rail for mounting handles, door locks and the like to the frame.

3,729,869

METAL DOOR FRAME

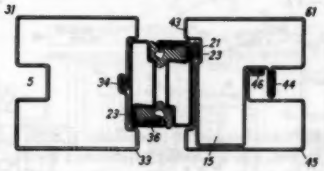
Hans Wenig, Mullerstrasse 2, 58 Hagen/Westphalia, Germany

Filed Aug. 13, 1970, Ser. No. 63,551

Claims priority, application Switzerland, Aug. 16, 1969, 12574/69

Int. Cl. E06b *7/16, 1/04*

U.S. Cl. 49—489 16 Claims



This invention relates to metal door frames and is concerned with the problem of simplifying the manufacture of such door frames and, therefore, rendering them less costly to produce. According to the invention metal door jambs and wing frames are constructed in the form of special hollow profiles capable of being combined with one another to form boxlike posts so that many different kinds of metal doors can be manufactured using a relatively small number of profiles. In each case a jamb profile and a wing profile has a groove on the sides facing away from each other and, on their adjacent sides,

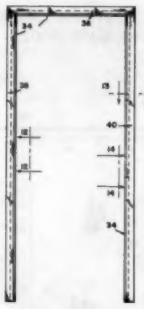
other grooves the width of which increases with the depth of the grooves, which other grooves receive draught excluding sealing strips.

3,729,870

METHOD AND ASSEMBLY OF UNIVERSAL JAMB AND TRIM MOLDING

Andrew M. Kvalheim, and Irwin S. Kvalheim, both of P.O. Drawer A, Petaluma, Calif.

Filed June 19, 1970, Ser. No. 47,686
Int. Cl. E06b *1/04*
U.S. Cl. 49—504 **16 Claims**



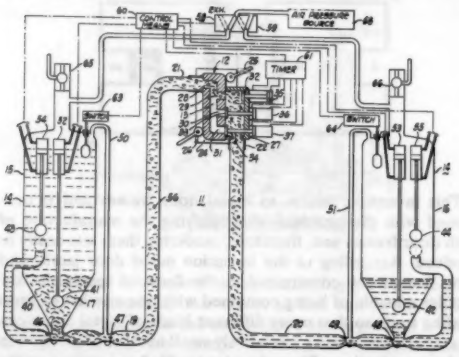
A multiple use molding assembly, primarily designed as a door jamb or window frame molding, including a central elongate member forming the jamb, and a pair of elongate stock pieces, forming jamb trim, all joined by a decorative laminate so that the trim may be folded about the jamb to accommodate the surface on which the assembly is mounted. The central member may be split, joined by pins, and have a door stop over the split. Rigid clips or flexible straps may join the jamb pieces together. The straps have tension means to anchor the straps firmly. When used as a door jamb assembly, the trim pieces are folded so that the jamb assembly may be inserted into a doorway opening; the trim pieces are then unfolded and nailed or secured into place. The method of making the molding includes rabbeting a shallow groove in a stiff sheet surface, along a folding line, rabbeting a deep groove in the reverse side of the sheet along the same line, applying an adhesively fixed laminate over the shallow groove, and re-rabbeting the deep groove to the shallow groove so that the sheet may be folded.

3,729,871

ABRASIVE CLEANING

Samuel K. Taylor, Cleveland, Ohio, assignor to Acme-Cleveland Corporation, Cleveland, Ohio

Filed Aug. 5, 1971, Ser. No. 169,261
Int. Cl. B24b *31/00*
U.S. Cl. 51—17 **31 Claims**



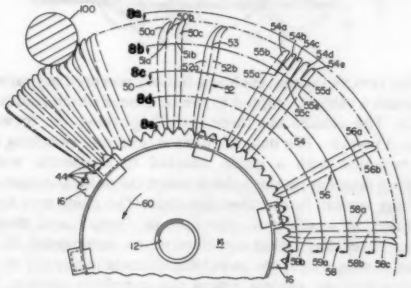
Abrasive and a fluid are mixed and supplied from a container to a first part of a workpiece to be cleaned and then returned to the container means. The abrasive cleaning is accomplished by reversing the flow of the fluid and abrasive mixture to direct the mixture to a second part of the workpiece and the cleaning is also effected by utilizing the mixture of air and a liquid as the fluid carrier of the abrasive. This mixture is used to clean metal castings or to debur machined metal parts. The foregoing abstract is merely a resume of one general application, is not a complete discussion of all principles of operation or applications, and is not to be construed as a limitation on the scope of the claimed subject matter.

3,729,872

ABRASIVE DEVICE

Elisha Winthrop Hall, Jr., Scituate, Mass., assignors to FL & JC Company, Rockland, Mass.

Filed May 5, 1971, Ser. No. 140,451
Int. Cl. B24d *17/00*, *11/00*
U.S. Cl. 51—358 **22 Claims**



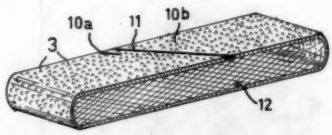
Rotary abrasive members formed of strip-defining sheet material gathered about a hub and having pre-weakened lines defining a plurality of abrasive strips which at the periphery can separate and conform to the work piece.

3,729,873

ENDLESS FLEXIBLE ABRASIVE BELT HAVING SOLDERED SEAMS AND A METHOD FOR MAKING SUCH SEAMS

Torsten Wilhelm Sandell, Markaryd, Sweden, assignor to Fabriksaktiebolaget Eka, Markaryd, Sweden

Filed Jan. 14, 1971, Ser. No. 106,458
Claims priority, application Sweden, Jan. 20, 1970, 634
Int. Cl. B24d *11/00*
U.S. Cl. 51—399 **2 Claims**



An endless flexible abrasive belt is made up from one or more pieces of abrasive sheet material. Abrasive sheet material of the kind referred to comprises a flexible backing member of paper or fabric, one side of which is provided with a coating of abrasive grits. The abrasive grits are anchored to the flexible backing member by one or more layers of glue. In order to form an endless belt the piece or pieces have to be joined at a pair of opposite or at successive edges respectively. The joint between abutting edges is made with thermoplastic resin as a solder so as to form a soldered seam the thickness of which is essentially equal to the thickness of the abrasive sheet material. Fiber reinforced or non-reinforced polyamide is a suitable material for the thermoplastic solder, and results in joints having good flexural and tensile strength.

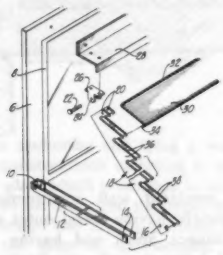
The soldering operation is simple and comprises the fixing of the edges to be joined in spaced or abutting parallel relation

to one another so as to form a narrow channel between the edges and melting thermoplastic resin into the channel to form a solder seam having a thickness which should not exceed the thickness of adjacent portions of the belt, so as to cause no "chatter marks" on a working piece.

3,729,874
VENTILATED AWNING

Stanley J. Albany, 9951 Voyager Circle, Huntington Beach, Calif.

Filed Sept. 22, 1969, Ser. No. 859,649
Int. Cl. E04f *10/08*
U.S. Cl. 52—78 **1 Claim**

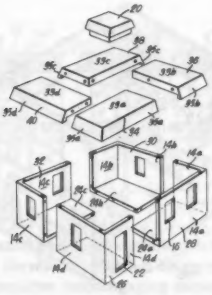


A louver awning of resilient material wherein each louver has an upwardly rolled upper edge and a downwardly rolled lower edge, the louvers being supported between spaced stringers, the stringers having louver receivers formed in upstanding edges thereof, one receiver being in the form of a curved socket to receive one rolled edge, the other receiver being a curved projection to receive the other rolled louver edge, the louvers being reversible about their longitudinal axes to expose first one side then the other to exterior view, and the louvers being held by their receivers under transverse tension to hold them in place without rattling.

3,729,875
PREFABRICATED BUILDING

Raymond Felson, 56 Rugby Place, Montreal West, Quebec, Canada

Filed Dec. 17, 1970, Ser. No. 99,023
Int. Cl. E04b *1/348*
U.S. Cl. 52—79 **7 Claims**

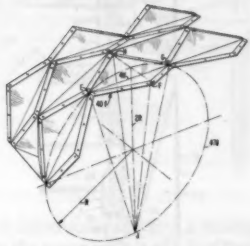


A building construction made up of a plurality of interlocking modular sections each section forming part of the floor and wall and/or roof and wall portions.

3,729,876
STRUCTURAL COMPONENT AND STRUCTURES COMPRISING THE SAME

Arpad Kolozsvary, 180 Morris Avenue, Mountain Lakes, N.J.

Division of Ser. No. 789,845, Jan. 8, 1969, Pat. No. 3,557,501, which is a continuation-in-part of Ser. No. 537,829, Feb. 28, 1966, abandoned. This application Jan. 25, 1971, Ser. No. 109,169The portion of the term of this patent subsequent to Jan. 6, 1988, has been disclaimed.
Int. Cl. E04b *1/32, 7/08*
U.S. Cl. 52—81 **22 Claims**

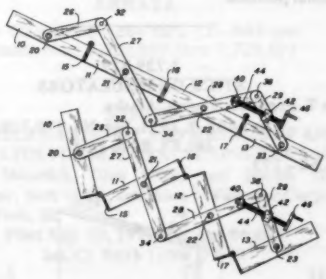


A universal folded plate component for structures, fastening means for joining such components together and structures comprising such components, the components themselves and the fastening means being geometrically designed so that the folded plate components can be connected in precise alignment in either the same or reversed fold position relative to one another to thereby build up structures having all curved configuration, all straight configuration or curved and straight configuration combined and having a variety of different ground plans.

3,729,877
FOLDING TRUSS

Raymond L. Hall, 19 Hamilton Court, Whippany, N.J.

Filed Sept. 29, 1971, Ser. No. 184,758
Int. Cl. B66f *3/22*
U.S. Cl. 52—109 **7 Claims**

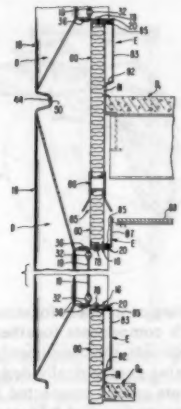


A folding truss is disclosed wherein the main beam member in a fully opened condition is arranged in a straight line and in a folded condition is disposed to be compacted to lay in an accordian style. The members providing the straight beam are hinged so as to mate and engage each other in an end-to-end arrangement when the beam is fully opened. A series of connected support arms are pivotally mounted on pins secured to the mid-portions of the main beam members. The connected support arms are pivotally connected at their ends to each other and when the main beam members are in the straight line fully opened condition the support members, which are longer than the main beam members, are disposed in a zig-zag pattern which may be about a 30 to 40° angle or slope to the axis of the main straight beam.

3,729,878
CURTAIN WALL CONSTRUCTION

David E. Termohlen, Atherton, and William G. Irvine, Cupertino, both of Calif., assignors to International Environmental Dynamics, Inc., San Jose, Calif.

Continuation-in-part of Ser. No. 876,407, Nov. 13, 1969, abandoned. This application June 25, 1971, Ser. No. 156,634
Int. Cl. E04b 2/88
U.S. Cl. 52—126 4 Claims

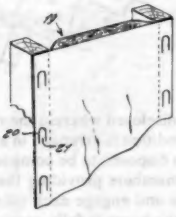


A curtain wall construction and process of erecting the construction is provided for a building which has each of its floors constructed at ground level and thereafter raised to the floors respective elevated positions. Modular curtain wall sections are fastened to frameworks attached to the floor edges when each building floor is at ground level. Thereafter, when the floor is raised to its elevated position, the top edge of the framework attached to the elevated floor keys into the bottom edge of the overlying framework attached to the floor above for a sliding engagement and the contiguous edges of the curtain walls overlap one another to provide a continuous weather surface on the exterior of the building. Thus, each floor is completely enclosed upon being raised to its final elevational position.

3,729,879
STICK ON INSULATORS

Andrew T. Franklin, Togiak, Alaska

Filed Aug. 9, 1971, Ser. No. 170,228
Int. Cl. E04b 1/88
U.S. Cl. 52—173 1 Claim

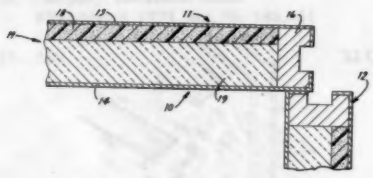


An insulation assembly for a building structure and which includes a device for quickly and easily securing the insulation, to wall joists so to eliminate the job of stapling insulation to the joists, the present insulator consisting of soft woolly insulation material such as glass-fiber placed between paper or equivalent sheets which are glued together along their side edges, and these side edges on one outer side of having a pressure sensitive adhesive applied thereto which is covered by a removable protective strip of paper that can be peeled off to expose the adhesive for placements against the wall joists.

3,729,880
INSULATED WALL CONSTRUCTION

Carlyle R. Eliason, Kalamazoo, Mich., assignor to Eliason Corporation, Kalamazoo, Mich.

Filed Nov. 4, 1971, Ser. No. 195,716
Int. Cl. E04c 2/24
U.S. Cl. 52—232 10 Claims

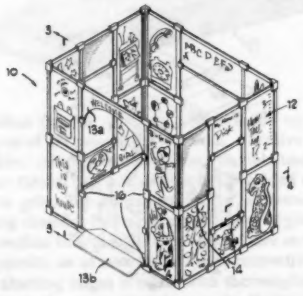


An improved insulated wall construction, particularly preformed wall panels, having metal outer sheets spaced a predetermined distance apart and having heat insulating material disposed between and completely occupying the space between the metal sheets. The insulating material preferably includes at least a first layer of foamed plastic and a second layer of matted fiber glass positioned in parallel relationship between the spaced metal sidewalls. The layer of fiber glass preferably has an initial uncompressed thickness substantially equal to the spacing between the metal sheets but, during assembly of the panel, is compressed a substantial amount to occupy only a portion of the space between the sheets, the remaining portion of the space being occupied by one or more layers of foamed plastic. The compressed layer of fiber glass will readily expand to substantially completely occupy the space between the metal sheets in the event the foamed plastic layer is destroyed, as by a flash fire.

3,729,881
CHILDREN'S PLAYHOUSE

Harry Disko, Park Ridge, Ill., assignor to Marvin Glass and Associates, Chicago, Ill.

Filed April 12, 1971, Ser. No. 133,277
Int. Cl. E04b 2/60; A63h 33/00
U.S. Cl. 52—280 1 Claim



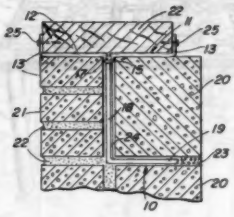
A children's playhouse comprised of interfitting frame and panel members which are easily assembled and disassembled and which may be assembled in different modes to create differing simulated house structures.

3,729,882

DEVICE FOR TYING WOODEN MEMBERS TO COMPOSITE BRICK AND MASONRY WALLS

George E. Allen, 15513 South Dobson Avenue, Dolton, Ill.

Filed Dec. 28, 1970, Ser. No. 101,596
Int. Cl. E04b *1/38*; E04h *12/00*
U.S. Cl. 52—300 1 Claim



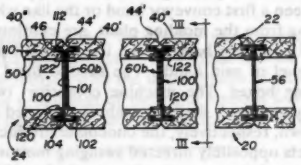
A device for anchoring and tying a wooden member to masonry wall constructions including a tying member embodying a base plate which is adapted to underlie the wooden member between the latter and the upper surface of a masonry wall construction and having portions which extend upwardly along the sides of the wooden member and are fastened thereto by suitable fastening means, such as nails or the like. The device includes an anchoring member which includes an upper and main body portion which in use is mounted in a transversely extending groove or recess formed in the base plate of the tying member. The anchoring member also includes a vertically extending depending arm portion which in use is anchored in a vertical position in a mortar joint between a tier of bricks and a tier of concrete blocks and the anchoring member also includes a lower end portion which extends angularly from the vertically extending depending arm portion of the anchoring member and in use is anchored in a horizontal position in a mortar joint between two tiers of the concrete blocks.

3,729,883

DEMOUNTABLE PARTITION ASSEMBLIES AND THE STUDS THEREFOR

Palmer B. Thompson, La Canada, Calif., assignor to United States Gypsum Company, Chicago, Ill.

Filed April 21, 1971, Ser. No. 136,106
Int. Cl. F04b *2/74*
U.S. Cl. 52—481 6 Claims



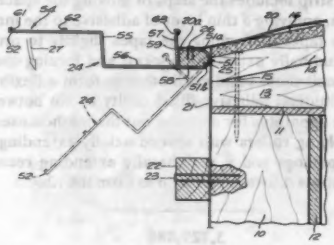
An improved stud and demountable partition assembly or wall constructed therewith, the stud being characterized by a single partition member interengaging means projecting from one edge, and double partition member interengaging means from the other edge, whereby the wall is constructed progressively up to that stud, leaving the partition member adjacent to the single partition member free of any connection to the improved stud and thereby completely accessible independently from the remaining wall portions.

3,729,884

ROOF LOCK ASSEMBLY METHOD

R. S. Dunn, Los Angeles, Calif., and William J. Rife, Phoenix, Ariz., assignors to Neet Products Incorporated, City of Industry, Calif.

Filed June 1, 1971, Ser. No. 148,470
Int. Cl. E04b *7/00*, *7/14*
U.S. Cl. 52—747 5 Claims



A method of roof construction in which a flexible roof cover sheet is placed over the upper surface of a roof frame and is attached to that upper surface at points spaced inwardly from its outer edge, an elongated roof lock member is positioned adjacent the outer edge of the roof frame, the cover sheet is extended out over the upper surface of the roof lock member, the cover sheet is attached to the upper surface of the roof lock member at various points spaced along the length of the member, the outer longitudinal edge of the member is rotated downwardly so as to stretch the cover sheet in a lateral direction, and then the roof lock member is rigidly fastened in its rotated position so as to maintain the lateral tension in the cover sheet.

Apparatus for carrying out the forgoing method, including a roof lock member which is formed as an aluminum extrusion, the outer surface of one longitudinal edge of the extrusion being rounded to provide a pivotal bearing upon the roof frame edge, and the extrusion being hollow adjacent its rounded edge so as to receive a wooden insert member for purpose of attachment of the cover sheet.

ERRATA

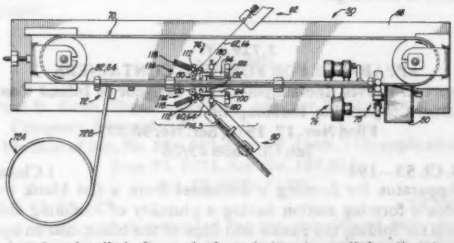
For Classes 52—264 thru 52—663 see:
Patents Nos. 3,729,889 thru 3,729,891

3,729,885

FLEXIBLE NAIL STRIP AND METHOD OF AND APPARATUS FOR MANUFACTURING THE SAME

Ronald J. Mosetich, Glen Ellyn, and Joseph Mosetich, Westchester, both of Ill., assignors to Fastener Corporation, Franklin Park, Ill.

Filed Nov. 18, 1970, Ser. No. 90,688
Int. Cl. B65b *13/04*, *27/10*
U.S. Cl. 53—3 11 Claims



A strip of nails is formed of spaced and parallel nails joined together by two pairs of spaced, flexible tapes and a thin layer

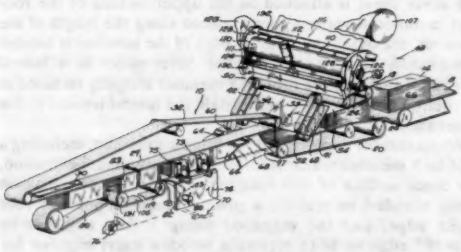
of adhesive. Each pair of tapes is bonded together in face-to-face relation between the nail shanks and bonded or adhered to the nails. Each pair of tapes is provided with a narrow outwardly bowed portion extending along the length of the tapes which fills with adhesive to prevent the adhesive from being squeezed out from between the tapes, to provide an increased mass of adhesive for bonding to the nail shanks, and to provide a small amount of resistance to compression without affecting the ability of the strip to be rolled or folded. The method of making the strip includes the steps of moving the spaced nails along a path, applying a thin layer of adhesive to the inner surfaces of the tapes, deforming the tapes slightly to provide a small longitudinally extending pocket, and forcing the tapes against the nail shanks and each other to form a flexible strip with a longitudinal adhesive-filled cavity or rib between the shanks. The apparatus for carrying out the method uses a pair of tape applying rollers with spaced axially extending shank receiving openings and a peripherally extending recess into which the tape is drawn by vacuum to form the rib.

3,729,886

METHOD AND APPARATUS FOR BANDING ARTICLES

William H. Lucas, Green Bay, and Kenneth G. Jones, De Pere, both of Wis., assignors to LeRoy E. Olsen and Sylvester A. Patrickus, both of Green Bay, Wis., part interest to each

Filed May 17, 1971, Ser. No. 143,783
Int. Cl. B65b *63/02, 13/20*
U.S. Cl. 53—24 **32 Claims**



A method and apparatus for applying restraining bands to layered articles such as a stacks of paper towels in which the apparatus includes upper and lower conveyors with converging runs to compress the stacks prior to application through a band delivery gap between two upper conveyors of pre-cut sheets of banding material to the upper surface of the compressed stacks. The banding sheets are cut from a web by a cut-off knife. The knife and apparatus for feeding the web are controlled by micro switches located in the article feed path which energize driven timing cams which control web feed and the cut-off knife. In addition to applying bands to discrete stacks or articles, a succession of longitudinally spaced bands can be applied to elongated stacks or "logs" such as a bolt of paper toweling of a length corresponding to the web width of the paper supplied to a towel interfolding machine. The log can be subsequently cut between the bands. Novel means are provided to maintain stack compression as the band is wrapped thereabout during continued advance of the stack to a point of discharge.

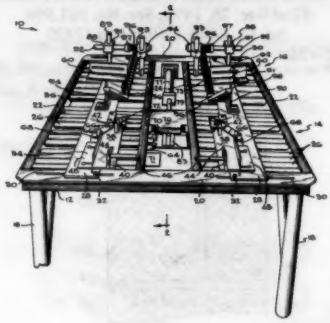
3,729,887

APPARATUS FOR FORMING CONTAINERS

Robert E. Reeves, Indianapolis, Ind., assignor to Inland Container Corporation, Indianapolis, Ind.

Filed Nov. 17, 1970, Ser. No. 90,273
Int. Cl. B65b *43/26*
U.S. Cl. 53—194 **1 Claim**

Apparatus for forming a container from a flat blank includes a forming station having a plurality of camming elements for folding the panels and flaps of the blank into an upwardly open container. The operator manually fills the container in the forming station, and the filled container is slid horizontally therefrom past a pair of adhesive applicators. The horizontal movement folds closed the remaining flaps of the



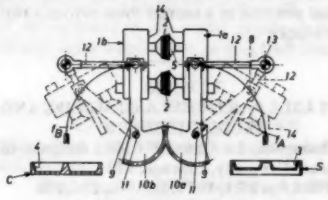
end closures as the container is pushed into a compression station where the adhesive sets.

3,729,888

MACHINE FOR TRANSFERRING MOLDED CHOCOLATE PRODUCTS FROM THEIR SHAPING MOLDS TO PACKING BOXES

Giovanni Carle, Via Neera 39, Milan, Italy

Filed May 10, 1971, Ser. No. 141,702
Claims priority, application Italy, June 20, 1970, 26315 A/70
Int. Cl. B65b *5/08*
U.S. Cl. 53—251 **10 Claims**



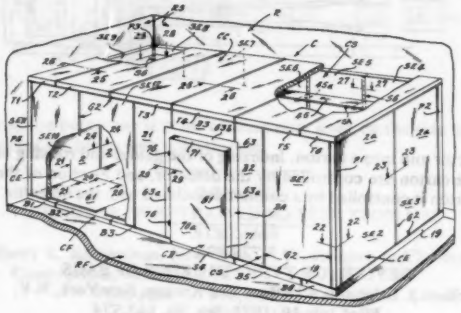
A machine for transferring molded chocolate products from their shaping molds to packing boxes, of the type designed to operate between a first conveyor band or the like whereon the molds, coming from the molding plant, are continuously fed, and a second conveyor band or the like, located parallel to, and at the level of said bands. The second band feeds the empty packing boxes. The machine comprises two sets of pneumatically operated, similar members, designed to take-up and to lay down, respectively, the chocolate products only, to which products oppositely directed swinging motions through 90° are imparted in respect of a vertical middle plane, whereby to bring said sets from their horizontal position, above of related conveyor bands, to a vertical position wherein they are confronted with each other, a vacuum distribution being timed in such a manner that the chocolate products are taken-up from the molds, coming from the molding plant on the related conveyor band, by one set of members, then transferred to the other set of members while both sets are confronted with each other, and finally laid down, overturned through 180°, into the packing boxes conveyed by the second band, or directly on to the second band to be conveyed to wrapping equipment.

3,729,889

MODULAR INSULATED PANEL SYSTEM

Gino L. Baruzzini, O'Fallon, Mo., assignor to Pet Incorporated, St. Louis, Mo.

Filed Sept. 14, 1970, Ser. No. 71,735
Int. Cl. E04b 1/343, 1/38
U.S. Cl. 52—264 13 Claims



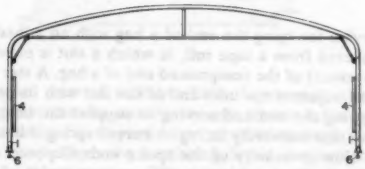
A modular insulated panel system in which a series of panels are assembled together with panel locking and sealing members to form an enclosed insulated space adapted for different environmental conditioning than the contiguous area.

3,729,890

SHIFTABLE PILLAR WHEEL SUPPORTING DEVICE

Shigekazu Yamamoto, Osaka, and Yasuo Ito, Nagoya, both of Japan, assignors to Taiyo Kogyo Company Limited, Osaka, Japan

Filed April 22, 1971, Ser. No. 136,540
Int. Cl. E04b 1/36, 1/347; E04h 12/18
U.S. Cl. 52—646 8 Claims



This invention relates to a pillar moving and supporting wheel mechanism provided in a pillar device for shelters wherein the friction with the upper flange of a rail is reduced to make the movement of the pillar smooth and light and to control the lateral sway and upward action of the pillar.

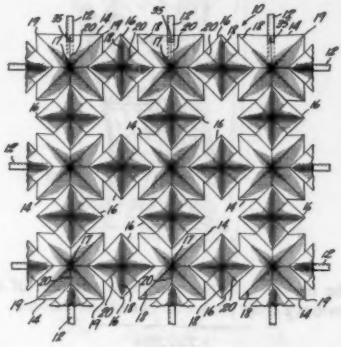
3,729,891

DECORATIVE OPENWORK PANEL STRUCTURE

Robert W. Olsen, Chatham, N.J., assignor to Construction Specialties Inc., Cranford, N.J.

Filed Nov. 8, 1971, Ser. No. 196,363
Int. Cl. E04c 2/42; E04f 19/06
U.S. Cl. 52—663 8 Claims

A panel structure has a framework of criss-crossing support members, a primary panel fastened to the framework at each intersection of the support members and a secondary panel fastened to each pair of adjacent primary panels. Portions of each secondary panel overlap a portion of the pair of adjacent primary panels to which the secondary panel is fastened, so that the fasteners which are used to secure the primary panels



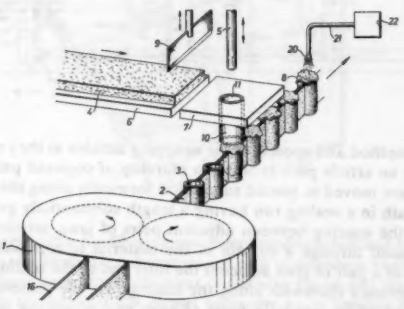
to the support members are concealed by the secondary panels.

3,729,892

METHOD AND A DEVICE FOR MANUFACTURING A PACKAGE CONTAINING A PLURALITY OF EAR-PLUGS

Bert Ake Aslund, Halsingborg, and Alf Harald Liljeqvist, Mjohult, both of Sweden, assignors to Gullfiber AB, Sweden

Filed Nov. 9, 1970, Ser. No. 87,699
Int. Cl. B65b 43/08
U.S. Cl. 53—23 15 Claims



The invention relates to the manufacture of a package containing a plurality of ear-plugs. Pieces of mineral fiber felt are successively by means of a plunger pressed through a hole of a mould down into the sleeves of a sleeve band fed below the mould.

3,729,893

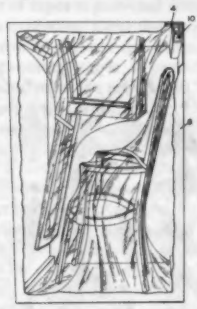
CHAIR PACK

Paul D. Bobb, High Point, N.C., assignor to Armstrong Cork Company, Lancaster, Pa.

Division of Ser. No. 886,531, Dec. 19, 1969. This application June 25, 1971, Ser. No. 157,013
Int. Cl. B65b 53/00
U.S. Cl. 53—27 2 Claims

A chair pack is provided for the shipping of two chairs within one carton. Each individual chair is fastened by a heat-shrinkable film to a piece of rigid corrugated fiberboard. The

fiberboard is then fastened to the end of a carton to hold the fiberboard and chair in place. The fastening of a chair at each



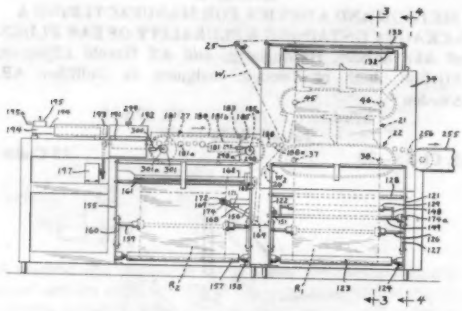
end of the carton with the proper orientation of the chair backs provides a chair pack with two chairs therein.

3,729,894

METHOD AND APPARATUS FOR WRAPPING ARTICLES

Roger H. Stohlquist, Rockford, Ill., assignor to Anderson Bros. Mfg. Co., Rockford, Ill.

Filed Dec. 2, 1971, Ser. No. 204,082
Int. Cl. B65b *9/02, 57/10*
U.S. Cl. 53—28 **25 Claims**



A method and apparatus for wrapping articles as they move along an article path in which a plurality of opposed pairs of jaws are moved in spaced succession forwardly along the article path in a sealing run having a length substantially greater than the spacing between adjacent pairs of jaws, articles are advanced through a curtain of the material to a position in front of a pair of jaws adjacent the inlet end of the sealing run for advance therewith along the sealing run, the presence or absence of an article in front of each pair of sealing jaws is sensed as they move along the sealing run, and the sealing jaws are relatively moved toward each other into clamping engagement with the curtain therebetween when an article is present in front of the sealing jaws as they move along the article path and the sealing jaws are moved out of clamping engagement with the web in the absence of an article in front of the sealing jaws, and the curtain of material is retracted when all of the pairs of sealing jaws along the sealing run are out of clamping engagement with the curtain.

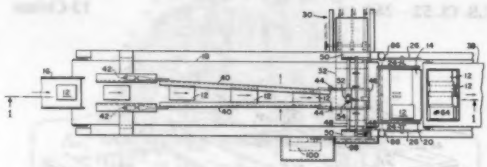
3,729,895

CARTON LOADING APPARATUS

Franklin Kramer, Lexington; Albert W. Soeldner, Dedham, and Joseph R. Paradis, Wayland, all of Mass., assignors to LaTouraine-Bickfords Foods, Inc., Newton, Mass.

Filed July 6, 1971, Ser. No. 159,695
Int. Cl. B65b *57/20*
U.S. Cl. 53—59 R **17 Claims**

A machine for automatic three-dimensional pattern loading of pouch packages in cartons, counting the packages and sequentially ejecting loaded cartons. The packages move in single file on a conveyor between movable lateral positioning guides, falling off the end of the conveyor past a photocell de-



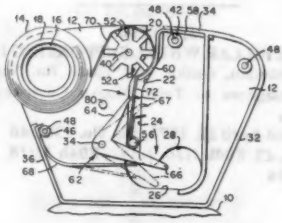
tector and into a carton. Indexing of the guides and rocking of the carton are controlled by the detector, and ejection of the carton is controlled by a counter associated with the detector.

3,729,896

DEVICE FOR TYING THE ENDS OF BAGS

Aribert J. Lehmann, 473 West End Avenue, New York, N.Y.

Filed July 19, 1971, Ser. No. 163,574
Int. Cl. B65b *51/06*
U.S. Cl. 53—198 A **7 Claims**



A device for tying the end of a bag with an adhesive tape strip severed from a tape roll, in which a slot is provided for the movement of the compressed end of a bag. A star wheel is mounted adjacent the inlet end of the slot with its poke ends overlapping the slot and serving to support the tape with its adhesive side outwardly facing. A curved spring is held by one end in close proximity of the spoke ends disposed over the slot, with its free end terminating at a midpoint of the slot width, on the inner side of the star wheel. A tape severing means, movable into severing position by the passage of a bag neck through the slot is arranged to sever the tape around the bag neck from the roll at a point spaced inwardly from the free end of the spring.

3,729,897

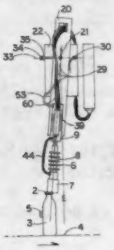
PENDULUM MOUNTED HEAT SEAL

George F. Howe, Poplar Grove, Ill., assignor to Champion International Corporation, Hamilton, Ohio

Filed Aug. 6, 1971, Ser. No. 169,754
Int. Cl. B65b *51/14*
U.S. Cl. 53—329 **10 Claims**

A cap is heat sealed over the mouth of a plastic bottle by a heat sealing mechanism which is mounted on a pendulum whereby the bottle is conveyed past the heat sealing device on a conveyor belt and at the same time heat sealing is accomplished. The pendulum mounting permits the heat seal device to follow the bottle. The cap has a plastic lining within a conventional bottle cap. A typical application is the heat sealing

of a bottle containing dairy products, uncarbonated, or carbonated beverages where the bottle is made of polyethylene



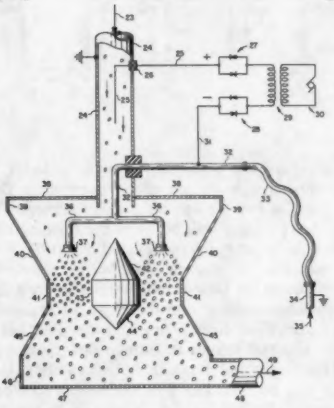
and the bottle cap is made of aluminum lined on the side adjacent the bottle with polyethylene.

3,729,898

REMOVAL OF ENTRAINED MATTER FROM GAS STREAMS

Harry L. Richardson, New York, N.Y., assignor to Chemical Construction, New York, N.Y.

Filed June 1, 1971, Ser. No. 148,452
Int. Cl. B03c 3/16
U.S. Cl. 55—7 **13 Claims**



Particulate material such as a fume, fog or mist, is removed from a gas stream by passing the gas stream laden with entrained solid or liquid particulate material through a venturi scrubber, and dispersing scrubbing liquid droplets into the venturi scrubber passage. The scrubbing liquid droplets are provided with a high voltage electrostatic charge, so that the liquid droplets attract and entrain the particulate material, which is preferably also provided with an electrostatic charge of opposite polarity to the charge on the liquid droplets. Improved gas scrubbing efficiency is attained, especially when removal of sub-micron or colloidal particles is required, in order to recover the particulate material and/or prevent air pollution.

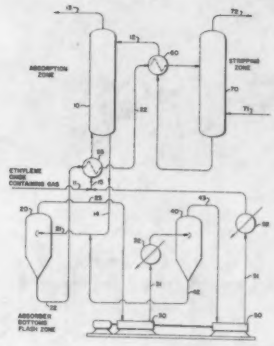
3,729,899

RECOVERY OF ETHYLENE OXIDE FROM ADMIXED INERT GASEOUS COMPONENTS

Jack Cunningham, Oakland; E. Gordon Foster, Emeryville, and Robert G. Vanderwater, El Cerito, all of Calif., assignors to Shell Oil Company, New York, N.Y.

Filed June 23, 1971, Ser. No. 155,959
Int. Cl. B01d 19/00
U.S. Cl. 55—44 **6 Claims**

Ethylene oxide is separated from admixed inert gaseous components and recovered as a gaseous fraction by (a) contacting the gaseous mixture with a lean aqueous absorbant to produce an ethylene oxide-rich absorbate; (b) flashing the ethylene oxide-rich absorbate at a temperature below about 65° C to produce a condensate lean in inerts; and (c) contacting, in an ethylene oxide stripping zone, the inerts-lean condensate with a stripping vapor at or slightly above atmospheric pressure to produce a gaseous overhead rich in ethylene oxide.

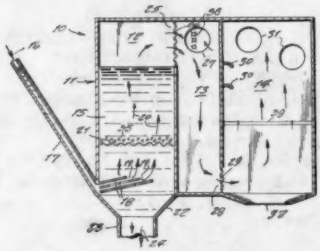


3,729,900

DE-SMOGER

William G. Denning, P.O. Box 321, Hudson, Colo.

Filed Nov. 30, 1970, Ser. No. 93,653
Int. Cl. B01d 47/02
U.S. Cl. 55—100 **7 Claims**



In apparatus for filtering out objectionable solids and harmful gasses from the exhaust gasses of a combustion engine, a first compartment or chamber containing liquid and through which the exhaust gas passes upwardly so to remove solids such as ash, carbon, soot and the like, a second chamber where neutralizers are introduced to neutralize poisonous gasses passing downwardly, and a third chamber wherein ozone gas can be added and magnetism is incorporated for filtering out metal particles as gasses pass downwardly.

3,729,901

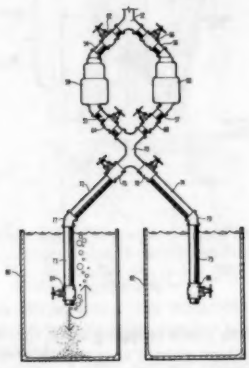
EMISSION AND POLLUTANT RECOVERY PROCESS AND APPARATUS

Dennis Hurshal Jackson, 850 West Osborn Road, Phoenix, Ariz.

Continuation-in-part of Ser. No. 888,021, Feb. 3, 1970, abandoned. This application July 20, 1971, Ser. No. 164,364
Int. Cl. B01d 47/02
U.S. Cl. 55—244 **4 Claims**

The recovery apparatus includes a collector device which may be connected to the exhaust flue or a furnace or disposed in a relatively confined area for collecting the exhaust gases or surrounding contaminated air. The collector device is con-

nected by a conduit to a suction-blower device which may be comprised of two suction-blowers disposed in parallel for reliability. A pair of liquid filled tanks are provided and conduits are connected at one end to the suction-blower device with the opposite ends being disposed beneath the surface of the



liquid. The process involves drawing the exhaust gases or contaminated air into the collector device by means of the suction-blower device and bubbling the exhaust gases or contaminated air through the liquid in the tank to remove all contaminates therefrom.

3,729,902

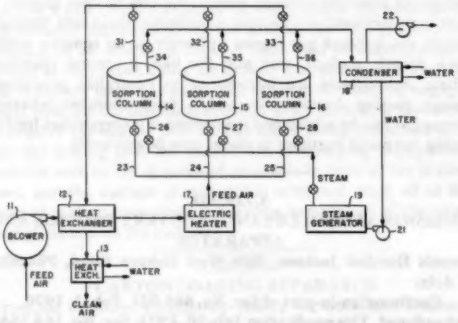
CARBON DIOXIDE SORBENT FOR CONFINED BREATHING ATMOSPHERES

Frank J. Ventriglio, 790 Fairview Avenue; David M. Zall, 10 N. Southwd Avenue; Cyril J. Stockhausen, 1977 Fairfax Road, all of Annapolis, and Donald R. Decker, Jr., 14-17 Taylor Avenue, Baltimore, all of Md.

Division of Ser. No. 755,548, Aug. 27, 1968, Pat. No. 3,619,130. This application April 21, 1971, Ser. No. 136,168

Int. Cl. B01d *53/04*

U.S. Cl. 55—389 **3 Claims**



An apparatus for removing CO_2 from air by passing said air through sorbent material made by treating molecular sieve-type zeolite with aqueous solution of any alkali carbonate. The sorbent material may be regenerated repeatedly by passing either heated air or superheated steam therethrough.

3,729,903

PNEUMATIC DUST COLLECTION SYSTEM

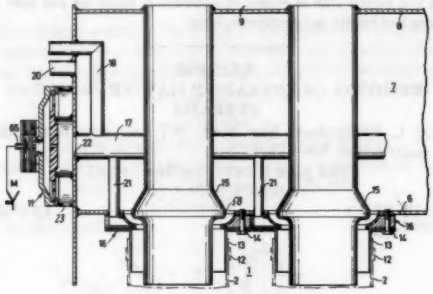
Frans Joris Espeel, Rosenbergstrasse 25, Oberuzwil, and Ernst Ackermann, Egghalden, 9231, Egg/Flawil, both of Switzerland

Filed Aug. 24, 1971, Ser. No. 174,473

Claims priority, application Switzerland, Aug. 28, 1970, 12902/70

Int. Cl. B01d *46/04*

U.S. Cl. 55—283 **17 Claims**



A pneumatic dust collection system includes a housing which defines a dust-air chamber portion, a flushing air chamber portion and a clean air portion arranged one above the other. A separating wall between the flushing air chamber and the dust-air chamber is penetrated by fittings for suspending filter hoses in the dust-air chamber portions which communicate through the fittings into the flushing air chamber. A connecting tube extends from the clean air chamber into the interior of each filter hose fitting and the filter hose which is carried thereby and defines an annular flow space between the interior of the hose and the flushing air chamber. This annular flow space may be closed off by an inflatable member which is disposed at the connection of the fitting to the separating wall. At this annular space the connecting tube includes a widened portion around which the flow is diverted and which is located opposite to the inflatable membrane. The interior of the inflatable membrane is connected to an air pressure line and it is inflated to close the annular flow passage between the interior of the filter hoses and the flushing air chamber. The apparatus includes a control system for controlling flushing air to the flushing air chamber and for filling this chamber before the membrane is deflated. An over and underpressure control is connected between the clean air chamber and the dust-air chamber to maintain a selected pressure difference between the clean air chamber portion and the dust-air chamber portion during operation. The flushing air chamber and the control line for supplying the air to the chamber is closed by a rapid depressurizer member which is closed by a signal from a preferred output of a monostable fluid mechanism element. An overpressure in he flushing air chamber causes the depressurizer to open rapidly.

3,729,904

GAS-LIQUID SEPARATOR

Jesse Louis York, 3893 West Liberty Road, Ann Arbor, Mich.

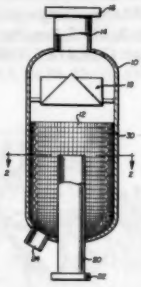
Filed June 16, 1969, Ser. No. 833,310

Int. Cl. B01d *45/12*

U.S. Cl. 55—457 **5 Claims**

A centrifugal gas-liquid separator having a boundary layer

control screen for inhibiting re-entrainment of separated

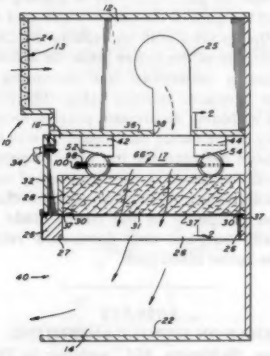


liquid with the gas stream.

3,729,905
FILTERING DEVICE

Anthony M. Diccianni, Norristown, Pa., assignor to Laminar Flow, Inc., Conshohocken, Pa.

Filed Aug. 20, 1970, Ser. No. 65,559
Int. Cl. B01d *25/22*
U.S. Cl. 55—490 6 Claims

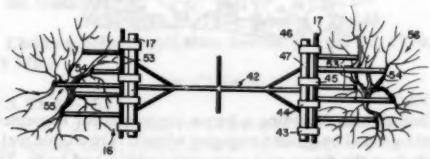


An air filtering device with its filter in a housing. The filter is restrained in the housing by the cooperation of opposed cylindrical members that bear against wedge-like surfaces so that the filter is urged against a support inside the housing.

3,729,906
HARVESTING SYSTEM USING TREE FRAME

Robert C. Coblentz, P.O. Box 2645, Winter Haven, Fla.

Filed Sept. 7, 1971, Ser. No. 178,177
Int. Cl. A01g *19/00*
U.S. Cl. 56—1 5 Claims

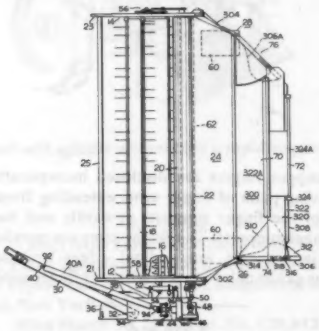


The present invention relates to a harvesting method and apparatus for harvesting fruit, and the like, from trees. It includes a frame connected between limbs of a tree in a manner that shaking the frame shakes all of the limbs connected thereto and means for gripping the frame and shaking it. The frame is permanently installed in the tree at predetermined points on the limbs of the tree, so that shaking one point of the frame will shake all of the limbs at predetermined points for loosening the fruit located in the tree. A method is also provided for attaching the frame in the trees either by drilling holes in the limbs or placing a clamp around the limbs at predetermined points and connecting frame arms with bolts either extending through the holes drilled in the tree or through clamps around the limbs.

3,729,907
MOWER CONDITIONER

Donald E. Burrough, and Benjamin A. Braunberger, both of West Bend, Wis., assignors to Gehl Company, West Bend, Wis.

Filed Feb. 25, 1972, Ser. No. 229,323
Int. Cl. A01d *45/04*
U.S. Cl. 56—14.1 10 Claims

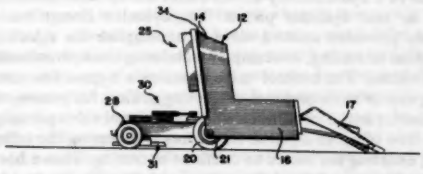


A tractor drawn and powered agricultural machine, such as a mower-conditioner for hay-like crops, comprises a main frame having a pair of spaced apart side walls between which a sickle mower, a tine reel, a pair of conditioning rolls, a crop gathering hood and windrowing means, and a pair of transport wheel assemblies are mounted. Operating power from the tractor is supplied through a rotatable power take-off shaft and clutches to a transmission unit comprising enclosed gears which is mounted on the main frame outboard of one side wall. The transmission unit is connected to and drives the conditioning rolls by means of universal drive shafts and the upper roll is spring mounted so as to be relatively movable and self-adjusting with respect to the lower roll. The transmission unit is also connected to and drives the sickle mower through a reciprocating pitman drive which includes a break-away bolt which breaks if the sickle-bar jams. The time reel, which is adjustably mounted on the side walls, is chain driven from the upper conditioning roll and tine pitch is adjustable by adjustable cam means.

3,729,908
HOUSING FOR A VEHICLE

Earl L. Miner, Moran, Kans., assignor to Lawlor Industries Inc., Addison, Ill.

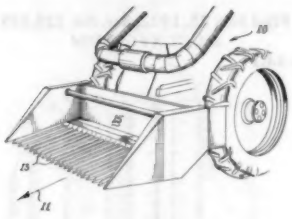
Filed April 21, 1972, Ser. No. 246,360
Int. Cl. A01d *35/22*
U.S. Cl. 56—16.7 4 Claims



An improved L-shaped housing for a vehicle which is constructed and affixed to the vehicle in a fashion such that the

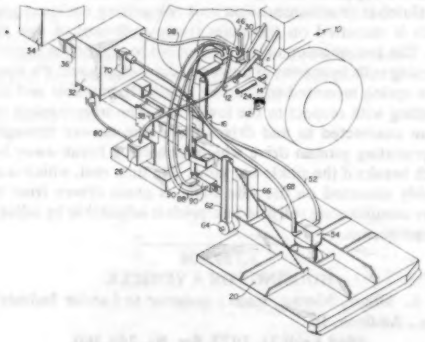
housing can be pivoted to expose the drive mechanisms, the driven members and the like of the vehicle, whereby they can be easily serviced.

3,729,909
COTTON STRIPPING MEANS
James H. Gray, Paradise Valley, and William E. Rood, Jr., Phoenix, both of Ariz., assignors to Garland Steel Company, Phoenix, Ariz.
Filed April 24, 1972, Ser. No. 247,018
Int. Cl. A01d *45/20*
U.S. Cl. 56—34 **9 Claims**



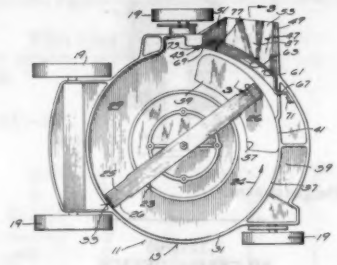
Cotton stripper fingers are disclosed incorporating finger supports having pairs of finger arms extending from the forward ends of the finger supports upwardly and backwardly along the finger supports. The finger arms are parallel to each other and incorporate longitudinal edges protruding into stalk-receiving channels between adjacent finger supports.

3,729,910
HYDRAULICALLY OPERATED OFFSET CUTTER
Eldred V. Hardee, Mount Vernon, Route 4, Lors, S.C.
Filed Nov. 19, 1971, Ser. No. 200,388
Int. Cl. A01d *69/00*
U.S. Cl. 56—11.9 **10 Claims**



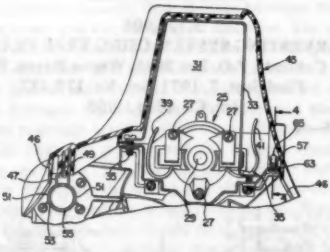
A hydraulically operated offset cutter having a hydraulic circuit driving a cylinder for raising, lowering or stabilizing the position of a hydraulically driven cutter driven from the same pump as said cylinder piston. The cylinder circuit has a uniquely provided control valve to accomplish the selective operations of raising, lowering or stabilizing the hydraulically driven cutter. The control valve contains a bypass line containing one or more pressure-restricting orifices for passing oil to the motor under conditions when the control valve provides useful flow of oil to a piston for raising or lowering the offset cutter, enabling the motor to continue operating. Thus a back pressure builds up behind the orifices and the oil is directed by the control valve to the cylinder piston causing it to operate as desired.

3,729,911
ROTARY LAWN MOWER WITH SAFETY FEATURES
Einar S. Dahl, and Earl H. Kidd, both of Galesburg, Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.
Filed April 3, 1972, Ser. No. 240,476
Int. Cl. A01d *67/00*
U.S. Cl. 56—320.2 **12 Claims**



Disclosed herein is a rotary lawn mower including a discharge chute of inverted U-shape form and including spaced side walls and an upper portion including a downwardly projecting central portion extending in the middle between the side walls and increasing in width in the direction between the side walls with increasing distance from the periphery of the path of the cutter blade, and decreasing in height above the ground with increasing distance from the periphery of the path of the cutter blade. In addition, the lawn mower includes a protective bar extending across the discharge chute in spaced relation below the upper discharge chute wall and including an arcuate portion located adjacent to the periphery of the cutter blade path. In one embodiment, the radial distance between the bar and the periphery of the cutter blade path decreases in the direction of rotation of the cutter blade. Still further, the bar includes a surface extending adjacent to the periphery of the cutter blade path and in inclined, radially outward and downward relation to the periphery of the cutter blade path.

3,729,912
SNAP ON SHROUD MOUNTING
Edwin J. Weber, Baltimore, Md., assignor to The Black and Decker Manufacturing Company, Towson, Md.
Filed Sept. 14, 1970, Ser. No. 71,634
Int. Cl. A01d *67/00*
U.S. Cl. 56—320.1 **4 Claims**

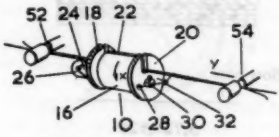


A lawnmower including a frame supported for movement over the ground by ground engaging wheels. A rotatable reel is mounted on the frame and cooperates with a bed knife. The reel is driven by a D.C. motor powered by a storage battery, both of which are disposed on the frame and covered by a shroud attached to the frame. The shroud serves to protect the motor and battery and is readily detachable from the frame for servicing of the motor and/or battery.

3,729,913
APPARATUS FOR JOINING TOGETHER TWO CONTINUOUS STRANDS

Raymond Patrick Wray, Harrogate, England, assignor to Imperial Chemical Industries Limited, London, England

Filed March 1, 1971, Ser. No. 119,611
Int. Cl. B65h *69/06, 69/00*
U.S. Cl. 57—22 3 Claims

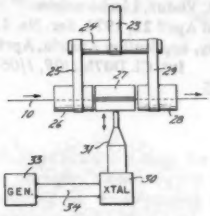


Apparatus for wrapping a thread about the overlapping portion of two continuous strands, e.g. two macrofil tire yarns, to form a joint, wherein a thread supply means is movable in a rotary path about the overlapping portion of the strands by a first drive means, and a second drive means is operable to import relative movement between the overlapping portion of the strands and the thread supply means longitudinally of the strands.

3,729,914
STRAND TREATMENT

Charles A. McClure, R.D. 2, Malvern, Pa.

Filed June 8, 1971, Ser. No. 150,962
Int. Cl. D02g *1/00*
U.S. Cl. 57—34 HS 17 Claims



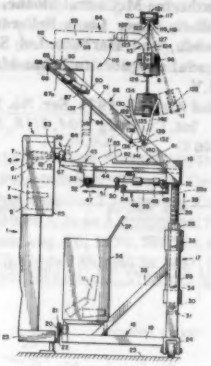
In vibratory bulking or crimping of textile strands, the twist-stopping tendency of a vibratory crimping head is overcome by false-twisting in the vicinity of the locus of vibration and thereby, in effect, forwarding twist therethrough. The crimping step conveniently is preceded by a step of drawing the strands to increased length.

3,729,915
AUTOMATIC DEVICE FOR LOADING TEXTILE MACHINE SPINDLES

Manfred Mayer, Remscheid-Lennep, and Reinhard Naydowski, Remscheid, both of Germany, assignors to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Wuppertal, Germany

Filed April 19, 1971, Ser. No. 135,143
Claims priority, application Germany, April 22, 1970, P 20 19 370.8
Int. Cl. D01h *9/10*
U.S. Cl. 57—53 12 Claims

Device or apparatus for automatically unloading and loading spools, cops, bobbins, cores, tubes and the like carried by textile machine spindles, e.g., in rows or banks along the face of the machine, said device essentially including a movable framework carrying two different gripping means reciprocating in a linear and curved path, respectively, so as to rapidly unload and load the same spindle without mutual interference. The device is particularly useful in combination with double-twist twisting machines or similar machines equipped with twisting spindles in order to properly mount and assemble all

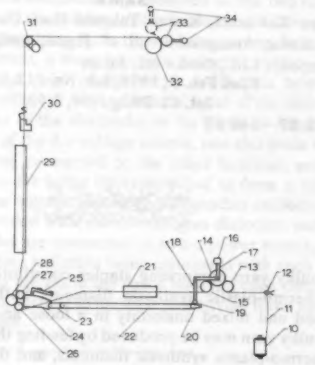


of the spool and spindle elements in a rapid sequential operation.

3,729,916
METHOD FOR TREATING YARN

Harold B. Lusk, Raleigh; Herbert E. Cooke, Burlington, and Leon D. Pryor, Raleigh, all of N.C., assignors to Beaunit Corporation, New York, N.Y.

Filed March 30, 1971, Ser. No. 129,512
Int. Cl. D02g *1/02*; D01h *1/28*
U.S. Cl. 57—34 HS 2 Claims

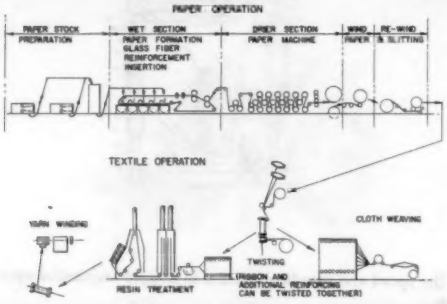


A method and apparatus for drawing and texturizing yarn in a continuous operation is described. Useful in a conventional drawing and texturizing operation wherein the yarn is passed through a drawing zone, a heating zone, and a false twisting zone to obtain drawn yarn having stretch characteristics. The improvement of this invention provides feeding and drawing means in the drawing zone which are synchronized to be engaged or disengaged simultaneously. This may be accomplished through the use of a connecting shaft and cam system which causes draw rolls and feed rolls to be simultaneously engaged and disengaged. This unique system allows an operator to "thread up" the entire apparatus prior to simultaneously initiating the operation.

3,729,917
REINFORCED ASBESTOS PAPER YARN AND METHOD OF MAKING SAME

Ivan Henry Sloane, deceased, late of Ottawa, Ontario, Canada (by Laura Catherine McConnel Sloane, executrix); Armand Ludovic Mailhot; Roger Louis Beliveau, both of Danville, Quebec, Canada, and Harbans Lal Sawhney, Longueuil, Quebec, Canada, assignors to Johns-Manville Corporation, New York, N.Y.

Filed Aug. 13, 1971, Ser. No. 171,655
Int. Cl. D02g *3/04, 3/18, 3/20*
U.S. Cl. 57—140 G **18 Claims**

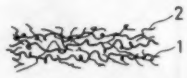


Asbestos yarn is produced by slitting a web of asbestos paper reinforced with spaced, longitudinally extending strands of glass fibers. Each ribbon formed by slitting includes at least one longitudinally extending strand of glass fibers. The ribbons are wetted and twisted to form an asbestos yarn. The yarns are uniform in diameter and suitable for use in dryer felts.

3,729,918
BULKY YARN AND METHOD OF PRODUCING THE SAME

Kentaro Kawasaki, Kamo; Takyuki Ono, Osaka, and Keizo Takizawa, Amagasami, all of Japan, assignors to Chori Company, Ltd., Osaka-shi, Japan

Filed Feb. 3, 1971, Ser. No. 112,186
Int. Cl. D02g *3/04, 1/02*
U.S. Cl. 57—140 BY **6 Claims**



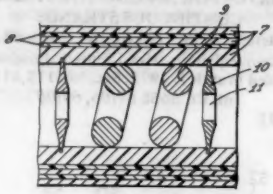
A bulky yarn comprising staples constituting a spun yarn and thermo-plastic synthetic filaments both of which are crimped and mixed uniformly in a loose and twisting state. The bulky yarn may be produced by feeding the spun yarn and the thermo-plastic synthetic filaments, and then crimping by passing them through processes of twisting-heat setting-releasing twist.

3,729,919
DRAG ROPE FOR SUBMARINE MEASURING EQUIPMENT

Helmut Weichardt, Hannover-Linden; Fritz Glander, Isernhagen NB; Gerhard Ziemek, Hannover; Walter Schuppe, Hannover; Hans Meyer, Hannover, and Bernd Eilhardt, Vinnhorst, all of Germany, assignors to Kabel -und Metallwerke Gutehoffnungshutte Aktiengesellschaft, Hannover, Germany

Filed Nov. 13, 1970, Ser. No. 89,299
Int. Cl. D07b *1/12, 1/16*
U.S. Cl. 57—144 **10 Claims**

A multi-layer drag rope for submarine measuring cables having plural layers of polyurethane and polyamide mesh,



with solid or hollow core.

3,729,920
NOVELTY TEXTILE YARNS

Leslie W. Sayers, Macclesfield; Jeffery W. Barnes, Coventry, and Norman Jackson, Leamington Spa, all of England, assignors to Courtaulds Limited, London, England

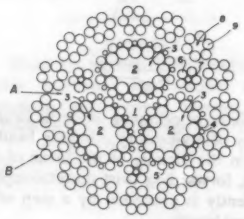
Filed March 6, 1970, Ser. No. 17,315
Int. Cl. D02g *3/02, 3/38*
U.S. Cl. 57—144 **4 Claims**

A novelty core yarn comprising a continuous filamentary glass core, preferably texturized, provided with a sheath consisting of a roving of textile fibers having flame-resistant properties. The sheath may consist of a roving of modacrylic textile fibers having inherent, built-in flame-resistance and composed of a copolymer of acrylonitrile with vinylidene chloride, vinyl chloride or both.

3,729,921
NON-ROTATING ROPE WITH SPIRAL STRANDS

Bernhard Stroh, Wien, Austria, assignor to Cordeurop Establishment, Vaduz, Liechtenstein

Filed April 22, 1971, Ser. No. 136,387
Claims priority, application Austria, April 27, 1970, 3804
Int. Cl. D07b *1/08, 1/06*
U.S. Cl. 57—145 **14 Claims**



The present rope is torsion free mainly because it has an inner rope formed by an inner layer of strands which is surrounded by an outer layer of strands and since the inner rope is constructed of at least three flattened strands and at least three round strands which are smaller than the flattened strands to fill the spacings between adjacent flattened strands. The inner strands surround a center member of elastic material.

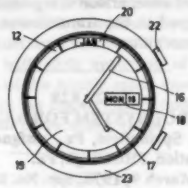
3,729,922
TIMEPIECE

Irving L. Wein, Chicago, Ill., assignor to Clinton Watch Company, Chicago, Ill.

Filed Sept. 13, 1971, Ser. No. 179,847
Claims priority, application Switzerland, July 2, 1971, 9730/71
Int. Cl. G04b *19/24*
U.S. Cl. 58—5 **9 Claims**

A timepiece, for example a wristwatch, having indicating means driven by a movement for indicating the hours and

minutes and also the date, characterized in that designation of the twelve months of the year are disposed on an annular surface surrounding the said indicating means. Associated with said annular surface is a predetermined reading position or an



index mark or a window, on or in which only one of the 12 month designations can be read at a time. The annular surface and/or the index mark or window, respectively, is adapted to be turned manually about the axis of the annular surface.

3,729,923

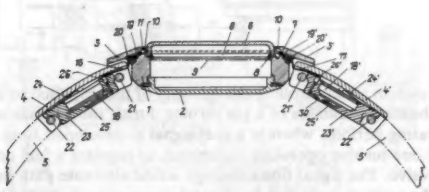
WRIST WATCH WITH DIAL ILLUMINATING

Florent Brigliano; Ernest Vogt, and Edmond Marmoud, all of Geneva, Switzerland, assignors to Fabrique de boites de montres F. Kuhn SA, Geneva, Switzerland

Filed March 11, 1971, Ser. No. 123,336

Int. Cl. G04b *19/30*; G04c *3/00*

U.S. Cl. 58—50 R **3 Claims**



A wrist watch has a glass fitted in a snap. An inwardly facing groove in the snap, normally closed by the glass, houses a miniature bulb connected by wires passing through water-tightly-closed openings communicating the snap with the outside of the watch case. The wires are connected to batteries housed in extensions to the watch case, said extensions including a switch to enable illumination of the bulb by a pressure on the wearer's wrist.

3,729,924

WATERTIGHT WATCH CASE AND WATCH

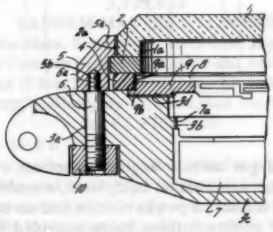
Masayoshi Aoki, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Keikosha, Tokyo, Japan

Filed May 30, 1972, Ser. No. 257,556

Claims priority, application Japan, June 2, 1971, 46/45343

Int. Cl. G04b *37/08*

U.S. Cl. 58—90 R **4 Claims**



A watertight watch and watch case construction in which a watch case body has an integral back cover and a cavity housing the watch movement. A seal gasket of elastic, deformable material is disposed circumferentially of the watch dial and a crystal support ring overlies the gasket with a watch crystal bonded thereto. A bezel has a flange or rim overlying a marginal circumferential part of the ring and is tightened by screws spaced around the watch case body deforming the seal so that a positive watertight seal is formed to protect the interior of the watch.

3,729,925

DRIVE ARRANGEMENT FOR TIMEKEEPING SYSTEM

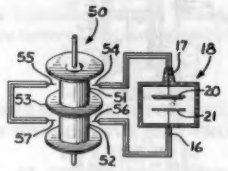
Frank W. Emerson, Peterborough, Ontario, Canada, assignor to General Time Corporation, Thomaston, Conn.

Division of Ser. No. 830,063, June 3, 1969, Pat. No. 3,545,655.

This application Aug. 26, 1970, Ser. No. 67,215

Int. Cl. G04c *3/00*; H02n *1/00*

U.S. Cl. 58—23 D **2 Claims**



A drive arrangement for a timekeeping system comprising an electrostatic motor including a rotor having a dielectric surface and a pair of electrodes operatively associated with the rotor for driving the rotor in response to a d-c potential applied across the electrodes. In one embodiment, one of the electrodes is mounted on one of the tines of a tuning fork, and the dielectric rotor surface is serrated for impulsing the tuning fork to vibrate the same while synchronizing the speed of the rotor with the natural frequency of the tuning fork. In another embodiment, both electrodes are mounted on the two tines of a tuning fork, and the serrated rotor is mounted between the electrodes for impulsing both tines of the tuning fork. In a further embodiment, a rotor having a dielectric surface is associated with two pairs of electrodes, each pair being associated with a different circumferential band of the dielectric surface, with one of the electrodes in the first pair connected to one terminal of the d-c voltage source, one electrode in the second pair being connected to the other terminal, and the other two electrodes being interconnected to form a voltage divider across the voltage source. In still another embodiment, the rotor is provided with a discontinuous dielectric surface, and the electrodes are connected to an a-c power source, with a source of ionizing radiation being associated with each electrode for ionizing the gas in the space between each electrode and the dielectric surface to increase the driving force applied to the rotor surface.

3,729,926

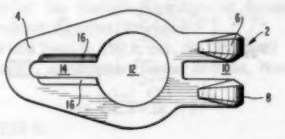
CLAW HOOK FOR CHAINS

Ervin Buske, P.O. Box 190, Gowrie, Iowa

Filed May 25, 1971, Ser. No. 146,643

Int. Cl. F16g *15/00*

U.S. Cl. 59—93 **1 Claim**



Two claws spaced to provide a slot therebetween extend from a flat body having an enlarged aperture with a slot ex-

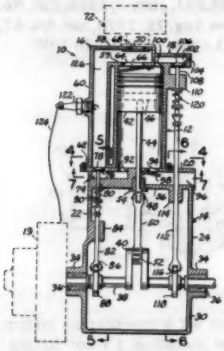
tending from one side. Chain links can be engaged in either the claw slot or the body slot. An attachment fitting in the body slot has a post engagable into an aperture in a device to which the attachment may be anchored.

3,729,927

TWO-CYCLE INTERNAL COMBUSTION ENGINE

James G. Graves, 115 Lake Aluma Drive, Oklahoma City, Okla.

Filed Jan. 3, 1972, Ser. No. 214,986
Int. Cl. F02g 3/02
U.S. Cl. 60—39.6 **3 Claims**



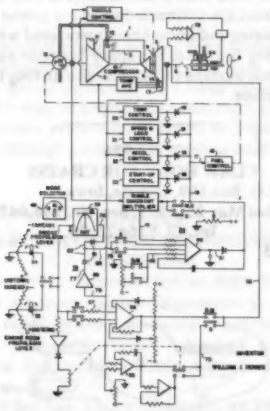
A piston driven compressionless engine having a combination intake and combustion manifold communicating with the upper end of the cylinder through a flap valve is filled with an explosive mixture from a carburetor by the upstroke of the piston in response to the opening of a suction valve opened by a crankshaft actuated cam with the previously burned gases being discharged from the cylinder during the piston upstroke by a crankshaft operated exhaust valve.

3,729,928

TORQUE CONTROL SYSTEM FOR A GAS TURBINE

William I. Rowen, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed March 26, 1971, Ser. No. 128,399
Int. Cl. F02c 9/08
U.S. Cl. 60—39.28 P **2 Claims**



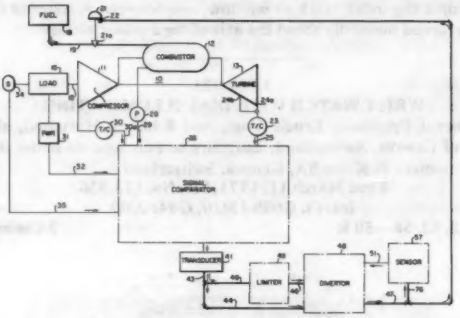
A gas turbine control system has a plurality of closed loop controls, each depending on a different operating parameter and providing a fuel control signal in accordance therewith. A predetermined linear relationship exists among the power output and the output shaft speed at the upper limit of acceptable output torque which is developed. A comparator is employed to compare the predetermined power setting signal applied to the gas turbine and a signal representative of the output shaft speed. Through this comparison it is possible to limit the output torque developed in the transmission components to an acceptable maximum value.

3,729,929

FUEL CONTROL SYSTEM FOR A GAS TURBINE

Roy W. Kiscaden, Springfield, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed March 9, 1971, Ser. No. 122,427
Int. Cl. F02c 9/06
U.S. Cl. 60—39.28 R **13 Claims**



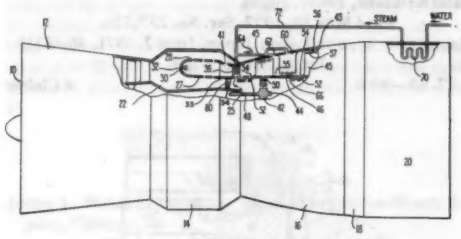
A system for controlling the quantity of fuel supplied to the combustion chambers of a gas turbine during the ignition and operating periods, wherein a fuel signal is developed from at least one turbine operating parameter, to regulate a fuel control valve. The signal flows through a first alternate path during the ignition period and a second alternate path during the operating period. A diverting device switches the signal from the first path to the second path upon response to a predetermined level of the control signal. A limiter device is provided in the second path to maintain a minimum signal to the valve corresponding to the level required to maintain combustion.

3,729,930

GAS TURBINE ENGINE

David Eyre Williams, Brinklow, England, assignor to Rolls Royce Limited, Derby, England

Filed June 23, 1970, Ser. No. 49,146
Int. Cl. F01d 5/08
U.S. Cl. 60—39.58 **3 Claims**



An industrial gas turbine engine comprises a multi-stage axial compressor, combustion equipment, a multi-stage compressor driving turbine, a power turbine and an exhaust duct, the compressor driving turbine being provided with cooling means to cool the blades of said turbine. The cooling means comprises a flow of steam from the compressor which flows

onto the surface of each turbine rotor blade through slots in the rotor rim. The steam also flows over the surface of the turbine rotor between adjacent blades and the space between adjacent blades is filled with a honeycomb material, the cells of which constitute ducts for the flow of steam. The stator vanes of the compressor driving turbine are cooled by steam from a heat exchange means which comprises a supply of pure water to a coil in the exhaust duct and a duct from this coil which is in communication with slots upstream of the nozzle guide vanes, the interiors of the nozzle guide vanes, the slots in the turbine rotor, slots in the engine casing upstream of the stator vanes and the interior of the stator vanes.

3,729,931

BOOSTED HYDRAULIC SYSTEMS

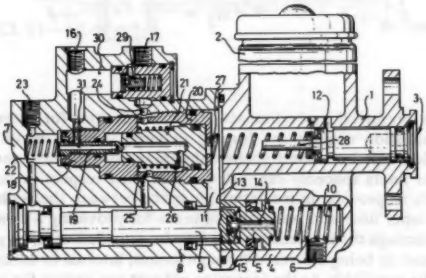
Brian Roger Shilton, and Donald John Byron, both of Lincoln, England, assignors to Clayton Dewandre Company Limited, Lincoln, England

Filed Dec. 14, 1970, Ser. No. 97,882

Claims priority, application Great Britain, Dec. 19, 1969, 62,006/69

Int. Cl. F15b *7/00*

U.S. Cl. 60—54.5 P **10 Claims**



A boosted hydraulic system for brake, clutch or similar actuation and adapted to actuate two independent load circuits comprises a manually-operable master cylinder, valve means actuated hydraulically or mechanically by movement of the master cylinder piston and controlling flow of pressurized fluid to a servo device and to one load circuit, and a supplementary hydraulic cylinder actuated mechanically by the piston of the servo device and the output of which actuates the second load circuit, the fluid delivered by the master cylinder also acting on the piston of the supplementary hydraulic cylinder but, in the event of failure of the servo device, bypassing said piston to flow directly to said second load circuit.

3,729,932

TANDEM MASTER CYLINDER

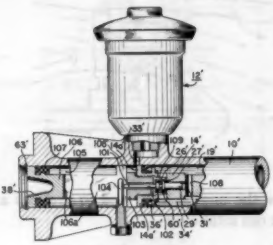
Katsushi Nakashima, Kariya-shi, Aichi-ken, Japan, assignor to Aisin Seiki Company Limited, Kariya-shi, Aichi-ken, Japan

Continuation of Ser. No. 835,635, June 23, 1969, abandoned. This application July 16, 1971, Ser. No. 163,441

Int. Cl. F15b *7/00*

U.S. Cl. 60—54.6 E **2 Claims**

A tandem type hydraulic master cylinder is provided with a working piston and is adapted for establishing two hydraulic pressure chambers hydraulically connected with two respective hydraulic brake systems, said chambers being hydraulically connected with respective oil reservoirs. Automatic valve means are provided in communication passages between each of said chambers and reservoirs. A balance pressure cylinder is further provided as being connected hydraulically



with said both hydraulic pressure chambers for pressure balancing service between said both chambers.

3,729,933

DRIVING ARRANGEMENT FOR RAIL VEHICLES, ESPECIALLY HIGH OUTPUT SELF-PROPELLED RAIL VEHICLES

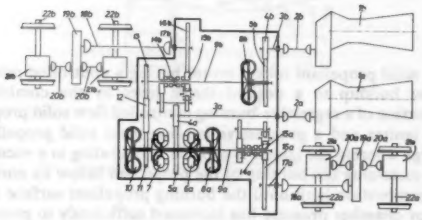
Alfred Knebel, 43 Essen-Bredeney, Germany, assignor to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Nov. 12, 1970, Ser. No. 88,855

Claims priority, application Germany, Nov. 12, 1969, P 19 56 742.1

Int. Cl. F01d *13/00*

U.S. Cl. 60—102 **6 Claims**



A driving arrangement, especially for a high performance rail vehicle having at least two independant sources of power and at least two driven axles and a power transmission connecting said sources of power with said axles and adjustable so that when only one source of power is operating it will supply power to a greater number of axles than when both sources of power are operating.

3,729,934

GAS TURBINE ENGINES

Ralph Murch Denning; Reginald Harold Wiltshire, and Clifford Stanley Woodward, all of Bristol, England, assignors to Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain & Northern Ireland, London, England

Filed Nov. 8, 1971, Ser. No. 196,662

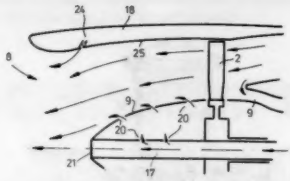
Claims priority, application Great Britain, Nov. 19, 1970, 54966/70

Int. Cl. F02k *3/04*

U.S. Cl. 60—226 R **5 Claims**

A turbo-fan engine having four blades capable of being turned from a forward thrust-producing position to a reverse thrust position, also includes means for biassing the flow

through the fan in the reverse thrust mode of operation towards the engine axis, to reduce the base drag due to low



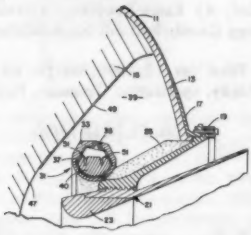
pressure air on the engine axis, and to prevent attachment of the flow to the fan intake lip.

3,729,935

SOLID PROPELLANT ROCKET MOTOR

James C. Fletcher, Administrator of the National Aeronautics and Space Administration with respect to the invention of; Warren L. Dowler, Sierra Madre; John I. Shafer, Pasadena; John W. Behm, San Pedro, and Leon D. Strand, Pasadena, all of Calif.

Filed May 28, 1971, Ser. No. 147,996
Int. Cl. F02k 9/04
U.S. Cl. 60—256 **5 Claims**



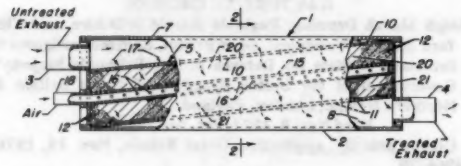
A solid propellant rocket motor having a controlled rate of thrust buildup to a desired thrust level by the combined utilization of a regressive-burning controlled flow solid propellant igniter and a progressive-burning main solid propellant charge wherein the igniter is capable of operating in a vacuum and sustaining the burning of the propellant below its normal L* combustion limit until the burning propellant surface and motor chamber pressure has increased sufficiently to provide a stable motor chamber pressure.

3,729,936

METHOD AND MEANS FOR CATALYTICALLY TREATING ENGINE EXHAUST GASES

Ted V. De Palma, Roselle, Ill., and Martin W. Perga, Billings, Mont., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed May 24, 1971, Ser. No. 146,216
Int. Cl. F01n 3/14
U.S. Cl. 60—274 **5 Claims**



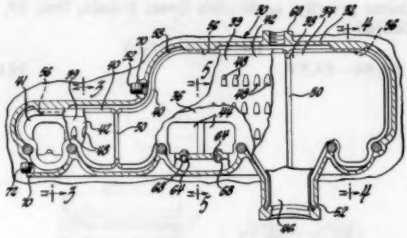
The method and means for catalytically treating engine exhaust gases which utilize a catalytic converter having a single bed of catalyst material which has an upstream reduction zone and a downstream oxidation zone. Air is introduced into the oxidation zone of the catalyst material in a direction generally transverse to the direction of flow of the exhaust gases. The engine is operated in a manner to maintain the content of the untreated exhaust gases generally low in oxygen and high in carbon monoxide. Therefore, the nitrogen oxides in the untreated exhaust gases are reduced by the carbon monoxide in the exhaust in the upstream zone of the bed and the air is admixed with exhaust gases to oxidize the hydrocarbons and carbon monoxide in the downstream zone of the bed.

3,729,937

ENGINE EXHAUST REACTOR AND METHOD OF MAKING

Mitchell J. Haddad, Detroit, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 17, 1971, Ser. No. 209,149
Int. Cl. F01n 3/10
U.S. Cl. 60—298 **4 Claims**



In preferred embodiments, exhaust reactors for internal combustion engines are formed as large volume manifolds having cast iron outer shells containing baffled sheet metal inner liners spacedly supported within their respective outer shells to provide an insulating air space between the walls of the inner liner and outer shell. Means for providing a flow of air through the insulating space may be provided with the preheated air being delivered through means, internal or external of the manifolds, to the incoming exhaust gas stream for mixture therewith to aid combustion of the exhaust products. Construction of such reactors includes the steps of fabricating a metal inner liner, forming a sand core along the outer surfaces of the liner exclusive of certain supporting portions, casting a metal outer shell around the sand core and sheet metal liner so as to provide a protecting and supporting housing, and removing the core sand from the insulating space, preferably by shaking it out through openings formed in the outer shell.

3,729,938

TRENCH SHORING FRAME

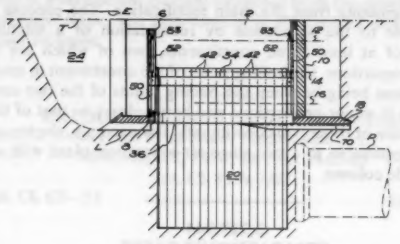
Anthony Ronald Seaton Morrice, 72 Kent Rd., Harrogate, England

Filed July 13, 1971, Ser. No. 162,168
Claims priority, application Great Britain, July 18, 1970, 34,939/70
Int. Cl. F21d 5/12
U.S. Cl. 61—41 A **7 Claims**

A trench shoring frame comprising a pair of side wall structures for engaging the side walls of a ground trench when said shoring frame is in said trench, said side wall structures being supported in spaced-apart relationship so as to be capable of supporting the trench walls, and a plurality of vertically disposed plate means movably connected to at least one guide frame so as to be capable of being moved vertically relative to said side wall structures and into and out of the ground below the lowermost level of the side wall structures when the frame is in said trench.

The plate means are preferably guided during their movement relative to the side wall structures by two vertically

spaced guide frames through which the plate means are slotted, an upper one of said guide frames being movable upwards and downwards so as to move said plate means by a plurality of fluid pressure piston-and-cylinder devices.



3,729,939

DEVICE FOR SEALING WATER AT COUPLING PORTION OF TUNNEL TUBES

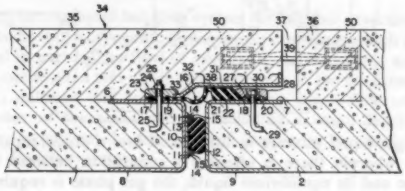
Soichiro Shimizu, 7-5 2-chome, Higashi-Shimbashi, Minato-ku, Tokyo, Japan

Filed Sept. 9, 1971, Ser. No. 179,101

Claims priority, application Japan, Sept. 10, 1970, 45/78869

Int. Cl. E02d *25/00*; F16l *49/00*

U.S. Cl. 61—43 **8 Claims**



A device for sealing water at the coupling portion of tunnel tubes which has first and second tunnel tubes disposed opposite at the respective end surfaces, an outside gasket fixed at the base end of the first tunnel tube and contacted at the end with the second tunnel tube, an inside strip gasket secured at both sides to the stepped recess formed along the inner peripheral ends of the first and second tunnel tubes, and a coupling tube secured to the stepped recess of the first tunnel tube for supporting the inner surface of the inside gasket.

3,729,940

OFFSHORE TOWER

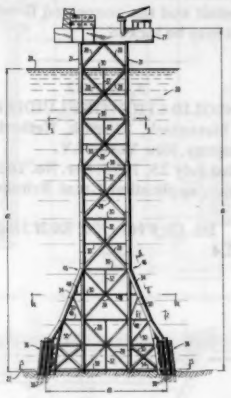
Albert M. Koehler, Houston, Tex., assignor to Brown & Root, Inc., Houston, Tex.

Division of Ser. No. 13,122, Feb. 20, 1970, Pat. No. 3,585,801. This application March 5, 1971, Ser. No. 121,464

Int. Cl. E02b *17/00*; E21b *40/00*

U.S. Cl. 61—46.5 **10 Claims**

A tower suitable for use in offshore well operations and the like and including a plurality of generally vertical columns extending from the bed of a body of water to a position above the surface of the body of water for supporting a platform thereupon. A quaternary batter brace system is connected to the generally vertical columns in a position intermediate the ends of the columns and beneath the surface of the body of water. Piling jacket clusters are connected to the free end of each of the batter brace members and are designed to rest upon the bed of the body of water. A plurality of piles extend through the batter piling jacket clusters and pin the offshore tower to the bed of the body of water. A reinforcing lattice connects adjacent batter brace members and pile jacket clusters solely on opposite sides of the vertical columns. The region between alternate batter braces and pile jacket clusters on opposite sides of the vertical columns are free of inner connecting reinforcing structure.



3,729,941

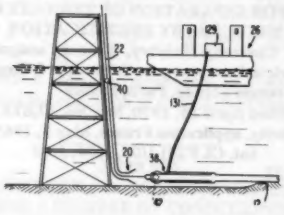
METHOD AND APPARATUS FOR LAYING PIPELINE

William R. Rochelle, Houston, Tex., assignor to Brown & Root, Inc., Houston, Tex.

Division of Ser. No. 822,409, May 7, 1969. This application Sept. 7, 1971, Ser. No. 177,964

Int. Cl. F16l *1/00, 27/12*

U.S. Cl. 61—72.3 **17 Claims**



A method and apparatus for making a connection between conduits, either submerged or to be submerged, characterized by the provision of a telescoping terminus on a flowline. In some operations where the flowline is laid either toward or away from an underwater installation, it may be lowered, while maintaining the terminus substantially fixed with respect to the remainder of the flowline, to a submerged position where the terminus is spaced from the installation. Subsequently, the terminus is telescoped into engagement with an alignment means, such as a riser adapter, either through diver assistance, or by remote operation of a terminus moving means. This means may be provided by a flexible drawline, which may be threaded through the alignment means, attached to the terminus, and subsequently tensioned to telescope the terminus. Release of the drawline may be accomplished through the application of fluid pressure.

Means are provided for latching the terminus into the riser adapter and for locking a slip joint between the terminus and the remainder of the flowline.

Other connections between the terminus and an installation conduit may be accomplished adjacent the surface of the water. The conduit and pipeline may be lowered together, with the terminus locked, and after lowering the terminus may be freed to permit proper positioning of the installation conduit relative to the installation. Alternatively, the lowering

operation may take place with the installation conduit in its proper position relative to the installation and with the terminus unlocked, whereupon relative movement of the telescoping terminus facilitates the operation of lowering the installation conduit and the connected flowline. After lowering the slip joint may be locked.

3,729,942

RAPID CONSOLIDATION OF FLUIDIZED SAND BED

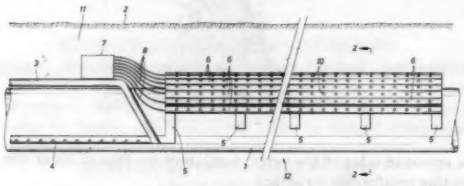
Johannes Van Steveninck, Rijswijk, Netherlands, assignor to Shell Oil Company, New York, N.Y.

Filed July 23, 1971, Ser. No. 165,602

Claims priority, application Great Britain, Aug. 21, 1970, 40,451/70

Int. Cl. F16l 1/00; E02f 5/02

U.S. Cl. 61—72.4 **7 Claims**



Method and apparatus for obtaining rapid consolidation of the fluidized sand mass on top of a submarine pipeline buried in the bottom of a body of water by fluidization of the bottom. Rapid consolidation is obtained by reducing the flow rate of the water injected into the bottom to about a third of the minimum flow rate necessary for fluidization of the bottom.

3,729,943

PROCESS FOR SEPARATION OF TERNARY GASEOUS MIXTURES BY RECTIFICATION

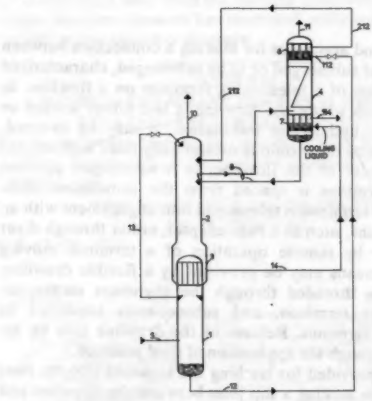
Pierre Petit, Chatenay-Malabry, France, assignor to L'Air Liquide Societe Anonyme pour L'Etude et L'Exploitation des Procedes Georges Claude, Paris, France

Filed April 28, 1970, Ser. No. 32,613

Claims priority, application France, May 5, 1969, 6914244

Int. Cl. F25j 1/00, 3/04, 3/02

U.S. Cl. 62—22 **4 Claims**



The present invention concerns a process in which a gaseous fraction is withdrawn from an intermediate level of a main rectification and subjected to a rectification in an auxiliary zone, the liquid fraction obtained in this auxiliary zone being returned to the said intermediate level of the main rectification.

The improvement according to the invention concerns the condensation of the said withdrawn gaseous fraction which is effected at the bottom and possibly simultaneously at the top of the said auxiliary zone by the vaporization of the liquid fractions originating from the main rectification. The process is applicable to the separation by rectification of a mixture formed of at least three constituents, two of which are in major proportions, the boiling point of the constituent in small proportions being between the boiling points of the two constituents in major proportions and being closer to that of the less volatile of these two constituents. For example, the invention is applicable to a two-stage a^{2+}-separation plant with an argon side column.

3,729,944

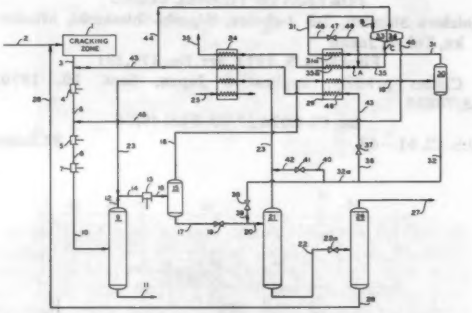
SEPARATION OF GASES

Carl S. Kelley, Bartlesville, Okla., and Frank H. Thorn, Antwerp, Belgium, assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed July 23, 1970, Ser. No. 57,493

Int. Cl. F25j 3/00, 3/02, 3/06

U.S. Cl. 62—39 **7 Claims**



A gas-liquid mixture is introduced into a phase separation zone wherein there is effected a separation between a gas phase and its equilibrium liquid; the gas phase is required to perform a maximum of expansion work and then passed in indirect heat exchange with the gas-liquid mixture; the desired cooling of the gas-liquid mixture not completely supplied by the gas phase is supplied by a portion of the equilibrium liquid with the remaining portion of the equilibrium liquid being passed to convenient locations for further processing.

3,729,945

MULTI-COMPONENT REFRIGERANT FOR THE LIQUEFACTION OF NATURAL GAS

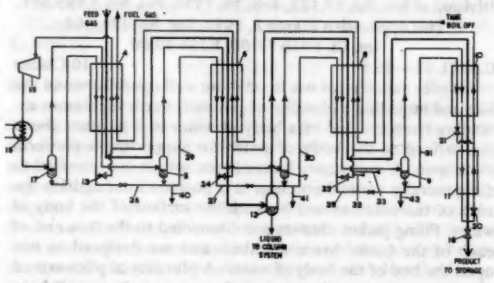
David T. Linnett, 83 Highwood Road, Hoddesdon, England

Filed Nov. 26, 1969, Ser. No. 880,009

Claims priority, application Great Britain, Nov. 29, 1968, 56,830/68

Int. Cl. F25j 1/00, 5/00, 3/02

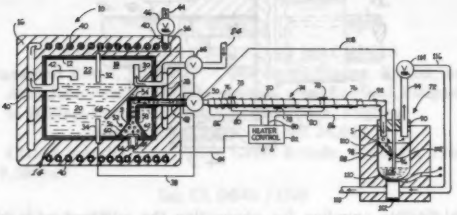
U.S. Cl. 62—40 **10 Claims**



The efficiency of mixed refrigerant gas liquefaction process, for example liquefaction of natural gas using a refrigerant con-

sisting of components extracted from the natural gas, may be improved by controlling the composition, and hence the temperature/enthalpy profiles, of the refrigerant streams in each heat exchange stage. Coarse control is effected by adding portions of a refrigerant mixture extracted from the previous heat exchange stage, and fine control is effected by adding pure liquefied gases.

3,729,946
CRYOGENIC LIQUID HANDLING SYSTEM
Alton A. Massey, 485 Fries Road, Tonawanda, N.Y.
Filed May 26, 1971, Ser. No. 146,903
Int. Cl. F17c *7/02*
U.S. Cl. 62—51 21 Claims



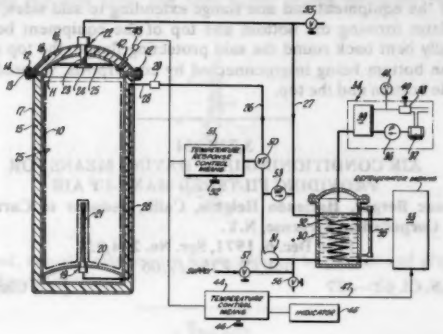
A cryogenic liquid handling system for infrared detection or the like having a cryogenic liquid supply container which is insulated in part by the flow of cryogenic vapor existing above the liquid level, a two phase flow generator in the container, a heated delivery line to maintain the two phase flow and a separator at the point of use, including a vapor feedback passage to prevent the formation of frost in the lens of the infrared detection system.

3,729,947
PROCESS FOR STORING BLOOD PLATELETS
Takeru Higuchi, Lawrence, Kans., assignor to ALZA Corporation, Palo Alto, Calif.
Filed Dec. 4, 1970, Ser. No. 95,353
Int. Cl. B65b *63/08*; C12k *9/00*; A61k *17/00*
U.S. Cl. 62—60 5 Claims

A process for storing blood platelets while simultaneously preserving the viability and integrity of the platelets by maintaining the platelets at a pressure of 100 to 1,000 psi and at a temperature of just above the freezing temperature of the platelets to about ambient temperature. The platelets may be stored alone or with platelet preserving agents.

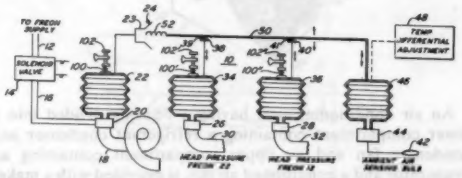
3,729,948
METHOD FOR PRESERVING COMESTIBLES
Ralph E. Schwartz, Elgin, Ariz., assignor to Ovitron Research Corporation, Elgin, Ariz.
Filed Nov. 5, 1970, Ser. No. 87,060
Int. Cl. F25d *17/02*
U.S. Cl. 62—64 4 Claims

Solid living comestibles such as fish are stored under pressure at below-0°C temperatures, in a substantially non-dilatable vessel. The environment for such storage is a coolant liquid such as seawater which is, of course, subjected continuously to the storage pressure but which is circulated through the vessel from a point outside the vessel. Thus, external to the vessel, means are provided for controlling the coolant temperature and pressure, and thereby also the environmental



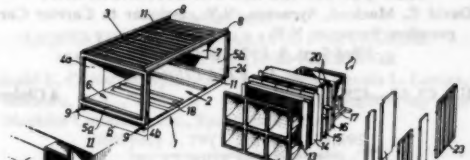
temperature and pressure of the stored comestibles within the vessel.

3,729,949
REFRIGERANT CHARGING CONTROL UNIT
Jack James Talbot, 430 West Doren Terrace, Vineland, N.J.
Filed Dec. 6, 1971, Ser. No. 205,184
Int. Cl. F25b *45/00*
U.S. Cl. 62—149 1 Claim



Movable switch elements responsive to temperature and pressure control the operation of a refrigerant charge unit during charging.

3,729,950
ARRANGEMENT FOR AIR CONDITIONING EQUIPMENT CONTAINING A NUMBER OF CONDITIONING UNITS
Lennart Astrom, Saltsjobadsvagen, Sweden, assignor to Aktiebolaget Svenska Flaktfabriken, Nacka, Sweden
Filed May 24, 1971, Ser. No. 146,200
Claims priority, application Sweden, May 29, 1970, 7497/70
Int. Cl. F25d *23/12*
U.S. Cl. 62—259 8 Claims



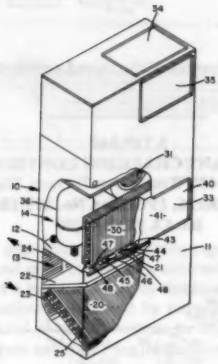
Air conditioning equipment containing several conditioning units comprising a bottom and a top, two opposing sides and two ends having an inlet and an outlet for the air to be conditioned, the bottom consisting of a bottom foundation resistant to torsional and bending forces, made up of two beams extending over the entire length of the equipment and two spacing elements resistant to torsional forces, adjoining each end,

the top consisting of a corresponding element, the beams having a web arranged somewhat rearward in relation to the sides of the equipment and one flange extending to said sides, the plates forming the bottom and top of the equipment being fully bent back round the said protecting flange, the top and the bottom being interconnected by cornerposts, secured to the bottom and the top.

3,729,951
AIR CONDITIONING UNIT HAVING MEANS FOR PROVIDING FILTERED MAKE-UP AIR

Isaac Berger, Hacienda Heights, Calif., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Dec. 6, 1971, Ser. No. 204,936
Int. Cl. F25d *17/06*
U.S. Cl. 62—427 **7 Claims**

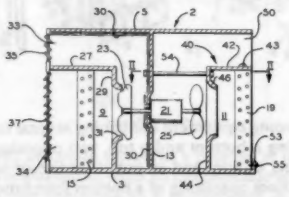


An air conditioning unit having a housing divided into a lower compartment containing a refrigerant condenser and condenser fan and an upper compartment containing an evaporator and a conditioned air fan, is provided with a make-up air passage in the partition dividing the two compartments. An air filter pad is positioned between an air inlet opening to the second compartment and the refrigerant evaporator so that its large area face is exposed for filtering air passing to the evaporator. The make-up air passage is disposed along the bottom side of the air filter pad so that the make-up air passes from the condenser fan upwardly through the small area bottom side of the air filter pad before passing in heat exchange relation with the refrigerant evaporator. A modified embodiment is described wherein the make-up air bypasses the refrigerant condenser.

3,729,952
SELF-CONTAINED AIR CONDITIONING UNIT

David E. Macleod, Syracuse, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Sept. 9, 1971, Ser. No. 178,981
Int. Cl. F25d *17/06*
U.S. Cl. 62—428 **4 Claims**

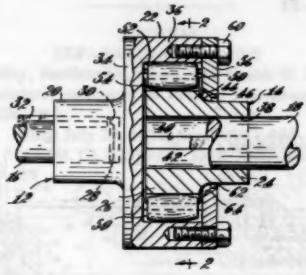


A self-contained air conditioning unit adapted for passage of air into and out of the condenser section of the unit through the back fence thereof, the condenser air inlets being arranged to provide improved fan loading for increased condenser efficiency and minimal sound generation.

3,729,953
COUPLING FOR CONNECTING THE ADJACENT ENDS OF SHAFTS

Arthur W. Wanzer, 9 Camolot Road, Yarmouth Port, Mass.

Substitute for Ser. No. 14,337, Feb. 26, 1970, abandoned. This application Feb. 17, 1972, Ser. No. 227,224
Int. Cl. F16d *3/18*
U.S. Cl. 64—9 A **1 Claim**

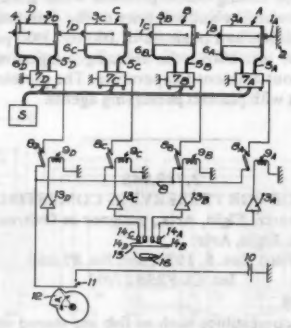


A flexible coupling for connecting the adjacent ends of shafts, comprising hubs adapted to be non-rotatably fixed to the adjacent ends of the shafts, said hubs providing radially spaced concentric bearing members, containing peripherally spaced, longitudinally extending opposed grooves within which are mounted roller bearings and walls at the end of the bearing members for retaining said roller bearings in the grooves and the inner bearing member within the outer bearing member, said grooves being of uniform cross-section from end-to-end and said roller bearings being shorter than the distance between the walls and tapering from a maximum diameter at their midlengths toward their ends.

3,729,954
RACHEL TYPE LOOMS

Jean-Paul Ducol, Bois D'Oingt, France, assignor to Centre Technique Industriel dit: Institut De France, Boulogne S/Seine, France

Filed May 18, 1971, Ser. No. 144,596
Int. Cl. D04b *23/00*
U.S. Cl. 66—86 **9 Claims**



This invention relates to Rachel type warp knitting machines and particularly to an arrangement for controlling the guide bars thereof. Normal arrangements for this purpose comprise a number of jacks mounted in series with their operating rods coaxially arranged, so that the length of their

strokes is additive. One of the end jacks is fixed by one of its parts to the knitting machine frame with the cylinders of the jacks being coaxially guided along the frame and a plurality of distributors is provided, each being associated with a corresponding jack and arranged to connect the jack to a source of fluid under pressure and to be controlled selectively in accordance with a pre-established program In accordance with this invention, the end jack opposite that end jack that is linked to the frame is securely attached to the heddle bar by one of its components and the piston rod of an end jack and intermediate jacks are securely attached to the cylinder of an adjacent jack passing into the cylinder thereof, in such a manner that its free end forms a stop for the end of the piston stroke of the associated adjacent jack: all the jacks are of the double-acting kind.

3,729,955

STRAIGHT BAR KNITTING MACHINES

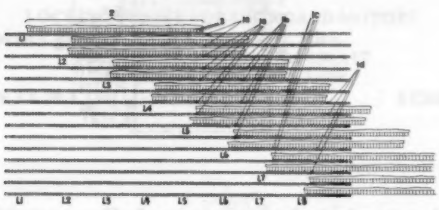
Raymond Blood, Shepshed; Colin Barry Strong, Syston, and Alan John Pearson, Loughborough, all of England, assignors to William Cotton Limited, Loughborough, England

Filed April 6, 1970, Ser. No. 26,028

Claims priority, application Great Britain, April 16, 1969, 19,387/69

Int. Cl. D04b *1/06*

U.S. Cl. 66—89 **7 Claims**



Straight bar knitting machine method and means of loop doubling in the last course of rib fabric to be followed by knitting non-rib fabric onto the rib fabric, by the use of controlled fashioning mechanism using two wide point bars with means providing for single and plural inward needle loop transfer motions of the point bars, plural needle outward reset motions of the point bars including adjustable ratchet control means, and single and plural selvedge stop inward motions, under control of a punched chart programming means, including fashions counting means, which is pre-arranged with reference to available information, so that loop doublings at any required frequencies can be formed automatically.

3,729,956

SELF SUPPORTING KNITTED LADY'S STOCKING

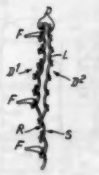
Max Bruno Nebel, Andreas-Schluter Strasse 18, Wiesbaden, and Erhard Max Nebel, Wilhelmstrasse, Hettenhain, both of Germany

Continuation of Ser. No. 763,098, Sept. 27, 1968, abandoned. This application April 28, 1971, Ser. No. 138,319

Int. Cl. D04b *9/46*

U.S. Cl. 66—172 E **5 Claims**

A self-supporting knitted lady's stocking having an outwardly turned, non-rolling welt and two spaced annular bands of elastic fabric at the top, at least one elastic band being within the welt area, and both bands having internally exposed, non-slip elastic yarn floats adapted to contact and grip the leg of the wearer.



3,729,957

FAN

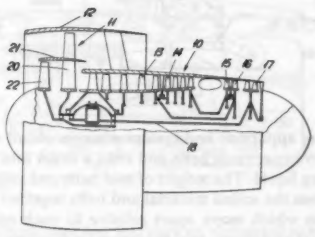
James Alexander Petrie, Littleover, and Kenneth Edward George Bracey, Findern, both of England, assignors to The Secretary of State for Defence, in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Dec. 21, 1971, Ser. No. 210,490

Claims priority, application Great Britain, Jan. 8, 1971, 975/71

Int. Cl. F02k *3/06*; F16h *37/06*

U.S. Cl. 60—226 R **9 Claims**



A fan comprises first and second rotor stages driven through a differential gear. The first stage is driven from the sun gear of the differential while the second stage is driven from the annulus gear of the differential. The planet carrier is driven from drive means. The invention is particularly applicable to gas turbine engines in which case the first stage of the fan may comprise a hub compressor and the drive means may comprise a gas turbine.

3,729,958

LIQUID TREATING APPARATUS FOR TEXTILE MATERIALS AND METHOD THEREFOR

Donald K. Christian, Spartanburg, S.C., and Dennis L. Lomax, Ashboro, N.C., assignors to Piedmont Engineering and Machine Company, Inc., Spartanburg, S.C.

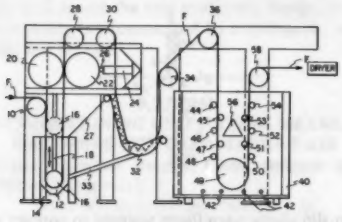
Filed May 3, 1971, Ser. No. 139,595

Int. Cl. B05c *3/04*, *3/132*

U.S. Cl. 68—19.1 **18 Claims**

Apparatus is disclosed herein for the liquid treatment of textile materials. Specifically, the liquid treating apparatus comprises a vessel in which are positioned a plurality of textile guides. The textile guides define a fabric path through the vessel and are positioned along both sides of the path. Fluid movement means such as a polygonal shaped rotatable element, especially a triangular shaped rotatable element is positioned adjacent the fabric path and acts on fluid in the vessel to create undulations in the textile material around certain of the guides as the textile material passes thereby. Preferably,

the textile material follows a U shaped path through the vessel. Ancillary apparatus is also disclosed as well as a method for



the liquid treatment and bulking of textile fabrics, especially knit fabrics.

3,729,959

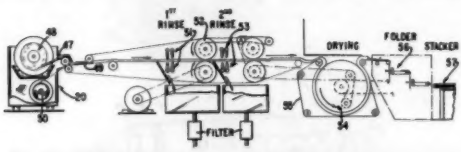
CASSETTE AND INTIMATE SYSTEM OF WASHING SOILED FABRICS AND MATERIAL

Benjamin Alvin Buss, and Donald C. Buss, both of 1315-23rd Avenue Court, East Moline, Ill.

Filed Aug. 10, 1971, Ser. No. 170,549

Int. Cl. D06f *89/00*; B05c *3/10*, *3/132*

U.S. Cl. 68—19.1 **13 Claims**



A washing apparatus and system wherein soiled material is fed between impervious belts and onto a drum into a cassette with washing liquid. The weight of said belts and soiled material compresses the soiled material and belts together at the top of the drum which move apart relative to each other at the lower zone of said drum, said movement subjecting said soiled material to a washing action. There is intimate contact between the flat soiled material between two successive layers of belts and the washing liquid. The cassette can function to wash the soiled material separately from any subsequent treatment.

3,729,960

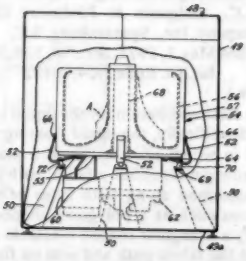
LEAF SPRING SUSPENSION FOR AUTOMATIC WASHER

Frank R. Skinner, II, St. Joseph, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Dec. 27, 1971, Ser. No. 212,590

Int. Cl. D06f *37/24*

U.S. Cl. 68—23.3 **9 Claims**



A suspension assembly in a clothes washing machine which includes a rotatable clothes receptacle disposed in a tub having a bottom side and a circumferential vertical side and susceptible to off-balance spinning characteristics when unevenly loaded. A plurality of leaf springs are provided, each having a fastened end and a free end, the fastened end being attached to the bottom side of the tub and the free end being disposed adjacent the vertical side of the tub. Dampening means are attached to the free end of the springs and are in frictional contact with the vertical side of the tub. Support means are provided to support the springs, and thereby support the tub resiliently on the springs.

3,729,961

APPARATUS FOR THE WASHING OF PREFERABLY CELLULOSIC PULP

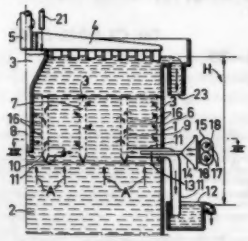
Nils Gustav Leffler, Sundsvale, Sweden, assignor to Sunds Aktiebolag, Sundsbruk, Sundsvall, Sweden

Division of Ser. No. 720,717, April 11, 1968, Pat. No. 3,622,262. This application March 17, 1971, Ser. No. 125,349

Claims priority, application Sweden, April 13, 1967, 5183/67

Int. Cl. D21c *7/00*

U.S. Cl. 68—181 R **8 Claims**



Apparatus for washing a suspension of a fibrous material as it passes through a container in which a washing liquid is passed from a supply chamber having a perforate wall into and through the suspension and then into a collecting chamber. Means are provided for interrupting the influx of washing liquid into the collecting chamber at suitable intervals by pressure variations in the liquid.

3,729,962

COMBINATION LOCK

Richard P. Harrington, and Russell J. Harrington, both of 17811 Riverside Drive, Channelview, Tex.

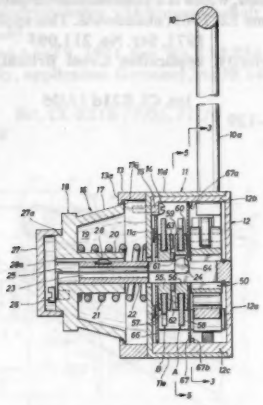
Filed Aug. 2, 1971, Ser. No. 168,113

Int. Cl. E05b *37/04*

U.S. Cl. 70—25 **19 Claims**

A combination lock of the exposed shackle type is disclosed. The shackle is held in its locked position by locking means that are released when a fence member is moved into gates located in the periphery of two tumbler wheels. The tumbler wheels are positioned for the gates to receive the fence by a dial and keyed shaft, after which the key is moved axially of the shaft out of driving connection with the tumbler wheels and into driving connection with the fence means. Rotation of the dial moves the fence means to release the shackle. The tumbler wheels have a rim and hub that are connected through a friction clutch type connection to allow the rim to be held while the hub is rotated. This allows the combination of the lock to be changed, when the lock is open, by actuating a lever mounted externally on the side of the lock housing that holds the fence means in engagement with the gates in the periphery of the tumbler wheels while the hubs are

rotated by the dial. If the combination is forgotten, apparatus is provided to locate the rims in a predetermined position from



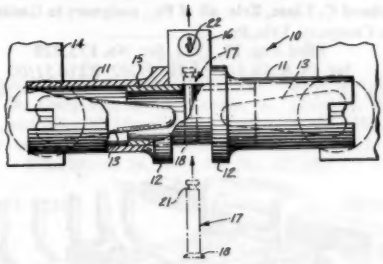
which position a master combination can be used to open the lock.

3,729,963

LOCKING DEVICE FOR OUTBOARD MOTORS

Martin F. Hintz, R-1-694-A, Alexandria, Minn.

Filed April 28, 1971, Ser. No. 138,117
Int. Cl. F16b *41/00*; E05b *73/00*
U.S. Cl. 70—230 **4 Claims**



A lock for preventing the theft of outboard motors. This lock includes a pair of sleeve members which insertible receive the motor mounting clamp arms and a smaller sleeve receives a key which is held in locking engagement with a removable block type lock.

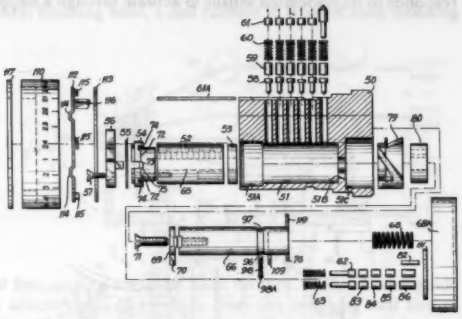
3,729,964

LOCK

Sam Shiao-Ming Hsu, New York, N.Y., assignor to Proof Lock International, Inc., New York, N.Y.

Filed June 21, 1971, Ser. No. 155,162
Int. Cl. E05b *27/00, 35/08*
U.S. Cl. 70—338 **19 Claims**

A lock capable of being operated by a limited access key and an unlimited access key so as to control the number of persons having lock opening capability. The lock is setable to a trapping phase whereby a key normally operable to open the



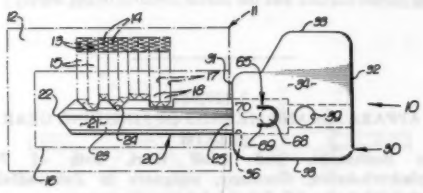
lock will be rendered inoperable and attempted use of the key will result in the key being trapped in the lock.

3,729,965

MULTIPLE PART KEY FOR CONVENTIONAL LOCKS

Klaus W. Gartner, 5711 Ravenspur Drive, Palos Verdes Peninsula, Calif.

Filed April 29, 1971, Ser. No. 138,675
Int. Cl. E05b *19/10*
U.S. Cl. 70—395 **14 Claims**



The multiple part key includes an elongated extruded shank having a lock end portion and an opposite apertured end portion, and includes a hilt having a guideway with opposed shoulder portions therein for receiving the opposite end portion to be secured therein by opposed shoulder portions from the hilt extending into an aperture in the shank. In a second embodiment, the opposite end portion of the shank is located in the guideway portion of an inner part of the hilt, with the shank aperture around a hilt inner part shoulder portion, and this assembly is telescoped into an outer hilt part with the shank extending through a guideway portion of the outer hilt part to extend therefrom while tabs from the hilt inner part extend into openings in the hilt outer part to locate the sides of the hilt outer part around the hilt inner part to secure the shank and the hilt together.

3,729,966

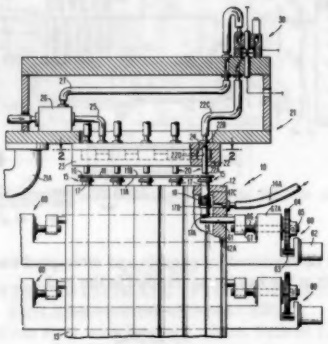
APPARATUS FOR CONTOURING THE SURFACE OF THIN ELEMENTS

Henri A. Khoury, Yorktown Heights, and Hans R. Rottmann, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 2, 1972, Ser. No. 223,681
Int. Cl. B21d *26/00*
U.S. Cl. 72—12 **20 Claims**

Apparatus and a method for contouring the surface of a thin element such as a semiconductor wafer, the apparatus including a plurality of individual reciprocatable suction cups for grasping at selected places the lower surface of the wafer. Superimposed of the wafer is a plurality of sensors for directing air against the opposite surface of the wafer and which senses,

by back pressure, the distance from the terminal end of the sensor to the wafer thereby sensing the contour of the surface of the wafer. Each sensor is connected to a comparitor which responds to its associated sensor to actuate through a stepping



motor and cam the individual reciprocatable suction cups to elevate or retract the same when the comparitor indicates a difference between the desired contour at that particular place on the surface and the actual contour of the wafer.

3,729,967

APPARATUS AND METHOD OF FINISHING GEAR TEETH

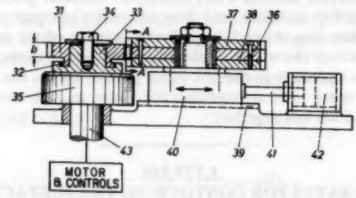
Otto Bauknecht, and Adolf Hurl, both of 7990 Friedrichshafen, Germany, assignors to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany

Filed May 10, 1971, Ser. No. 141,708

Claims priority, application Germany, May 12, 1970, P 20 22 937.2

Int. Cl. B21h *5/00*

U.S. Cl. 72—102 **5 Claims**



Rolled or machine-cut gears are finished by a rolling action in engagement with a die roll comprising a guide gear intermediate a pair of side gears. The outer gears form chamfers on the tooth edges while the guide gear, when working without flank clearance against the work gear, prevents flank bulging and effects smoothing. The teeth of the work gear are substantially confined by the teeth of the three gears of the die roll to prevent bulging of material due to the effect of chamfering as well as effecting burr trimming and smoothing.

3,729,968

WORKING OF STRIP METAL

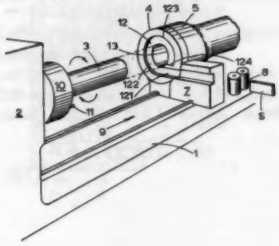
Douglas C. Norris, 6 Saviles Close, Eaton Socon, England

Continuation-in-part of Ser. No. 33,856, May 5, 1970, abandoned, which is a continuation-in-part of Ser. No. 832,804, June 12, 1969, abandoned. This application Dec. 22, 1971, Ser. No. 211,005

Claims priority, application Great Britain, May 5, 1969, 22,795/69

Int. Cl. B21d *11/06*

U.S. Cl. 72—129 **12 Claims**



Annular metal rings are manufactured by winding metal strip into a tightly compacted helical coil, cutting the coil, and securing together the ends of the individual rings so formed. Compensation for distortion of the strip produced by winding the strip is made by a die against which the strip being wound is pressed by force applied through the coil.

3,729,969

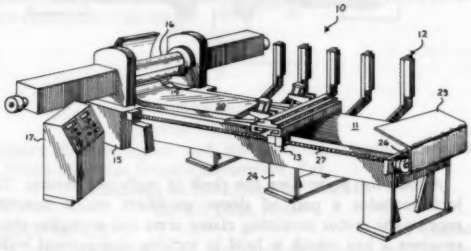
BARREL FORMING PRESS

James W. Gibson; Donald A. Videtto, both of North East, and Richard C. Linse, Erie, all of Pa., assignors to General Electric Company, Erie, Pa.

Filed Aug. 19, 1971, Ser. No. 173,028

Int. Cl. B21b *3/00*; B21c *37/02*; B21d *51/00*

U.S. Cl. 72—127 **36 Claims**



A numerically controlled apparatus and method for forming barrels of a desired diameter by successively advancing incremental portions of flat metal stock along a longitudinal path, and transversely deforming each portion with a ram reciprocally disposed in a vertical plane and acting against an oppositely disposed non-uniform concave die, the apparatus including a sensor and feedback system responsive to determine magnitude of permanent deformation and to actuate the ram in relation thereto to correct for errors, and including the provision for transversely retracting the ram to allow for removal of a completed cylinder.

3,729,970

GROOVE FORMING COLD ROLLING TOOL

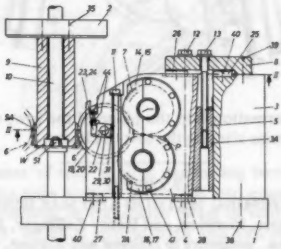
Otto Propach, Markdorf; Heinz Veittinger, Langenargen, and Karl Jauch, Ravensburg, all of Germany, assignors to Zahnradfabrik Friedrichshafen Aktiengesellschaft, Friedrichshafen, Germany

Filed April 9, 1971, Ser. No. 132,854

Claims priority, application Germany, April 14, 1970, P 20 17 709.7

Int. Cl. B21b *17/06, 31/30*

U.S. Cl. 72—208 **9 Claims**



A ram or mandrel having a splined end to effect a die or drives a cup shaped workpiece into engagement with rollers arranged to press radially against the outer wall of the workpiece and force the workpiece material into the valleys between splines thus forming a complementary splined formation of the cup. A plurality of forming rollers are operative as a male die. Each roller is backed by a pair of supporting rollers wherein a forming roller and a pair of backing rollers form a unit radially adjustable relative the workpiece, each such unit being carried in a relatively stationary sector shaped body, all units being surrounded by a common reinforcing radial support ring and carried on a bed plate, there being one such unit for each formation, such as a crevice, to be formed in the workpiece.

3,729,971

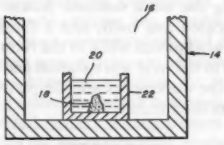
METHOD OF HOT COMPACTING TITANIUM POWDER

Thomas B. Gurganus, Avon; Gordon K. Turnbull, Rocky River, and Allen M. Montgomery, Cleveland, all of Ohio, assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed March 24, 1971, Ser. No. 127,457

Int. Cl. B22f *3/24*

U.S. Cl. 72—226 **15 Claims**



Hot isostatic compacting of titanium or titanium-base alloy powder to a product having controlled interstitials and microstructure and possessing outstanding end properties, low porosity and high density and one which does not require subsequent forging.

3,729,972

METHODS AND APPARATUS FOR ROLLING

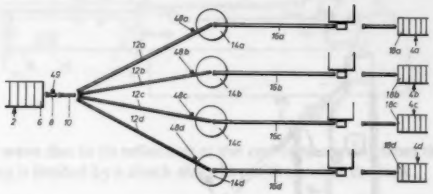
Friedrich Kocks, Freiligrathstrasse 1, Dusseldorf, Germany

Filed Feb. 1, 1972, Ser. No. 222,551

Int. Cl. B21b *41/00, 39/18*

U.S. Cl. 72—228 **10 Claims**

A continuous small section rolling mill is provided including a roughing mill line and a plurality of finishing mill lines spaced therefrom, the lines being operated so that the output from the last stand of the roughing mill line is approximately the same as the product of the combined intake speed of the several finishing lines, a coil furnace in front of each finishing mill line, coiling means in each furnace, a distribution guide for selectively feeding stock from the roughing mill line to each coiling means and delivery guide means at each furnace whereby the stock can be directed to the finishing mill line associated with said furnace.



3,729,973

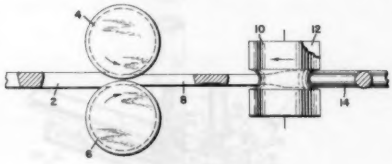
ROLL PASSES FOR ROLLING A BAR OF CONTINUOUSLY CAST NON-FERROUS METAL AND THE METHOD IMPROVING THE METAL STRUCTURE

Robert D. Wykes, Worcester, Mass., assignor to Morgan Construction Company, Worcester, Mass.

Filed April 2, 1971, Ser. No. 130,702

Int. Cl. B21b *13/12*

U.S. Cl. 72—234 **18 Claims**



A first pair of rolls preferably of unequal diameter and grooved in a manner to change the cross-sectional configuration of a bar of non-ferrous metal delivered from a continuous casting machine, from a generally trapezoidal section of substantial depth to a wider flattened less asymmetrical section, flat on both sides or flat on one side and concave on the other, and a second pair of rolls having concave grooves which will reduce the flattened bar delivered by the first pair of rolls to a generally symmetrical bar. The successive passes effectively carry out a method of operation which works the loose structure of the continuously cast bar into a more homogeneous fibrous structure.

3,729,974

VEHICLE BODY TOOL FOR TWISTING DOORS

Ersey Clinton Tidwell, Route 2, Dickson, Tenn.

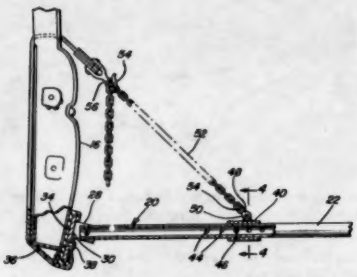
Filed Feb. 3, 1972, Ser. No. 223,135

Int. Cl. B21d *31/00;* **B21j** *13/02*

U.S. Cl. 72—292 **6 Claims**

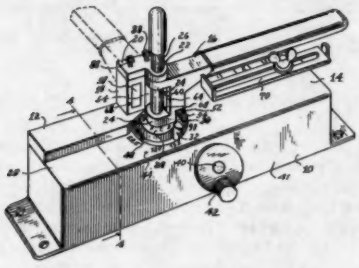
An elongated lever bar defining a handle at one end and including an abutment pad at the other end for engagement with either the inner or outer surface of a vehicle door. One end of a wide strap is anchored to the abutment pad and the strap may be passed about the side of a vehicle door remote from the side thereof against which the abutment pad is abutted. The free end of the strap includes an anchor hook and one end of a tension member is anchored to the midportion of the lever bar and the other end of the tension member is engageable with the anchor hook carried by the free end of the strap. The

bar may be engaged with a vehicle door in the prescribed manner in order to twist the door in order to straighten



damaged doors and assist in aligning vehicle doors relative to the associated vehicle body door opening.

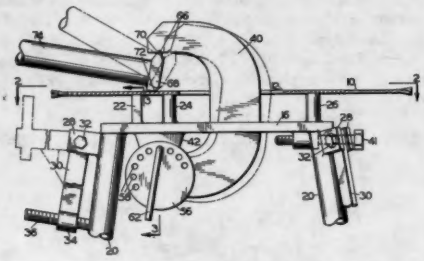
3,729,975
BENDER FOR WIRE OR FLAT STOCK
Peter P. Del Monica, 10 London Drive, Bordentown, N.J.
Filed May 10, 1971, Ser. No. 141,843
Int. Cl. B21d *9/05*; B21j *13/08*
U.S. Cl. 72—388 **9 Claims**



A small bender designed to perform the accurate bending of metal or thermo-plastic round or flat stock; worm-gear means for adjusting the lever stop pin to various angular positions; means for adjusting the width of the stock-receiving space; and means for controlling the extent of the bending stroke of the lever in accordance with the degree of resiliency of the stock.

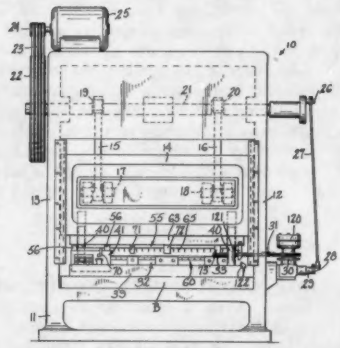
3,729,976
METHOD AND APPARATUS FOR STRAIGHTENING SAWS
Russell A. Heitzman, 5005 Kenway Drive, Tillamook, Oreg.
Filed Dec. 28, 1970, Ser. No. 101,657
Int. Cl. B21d *3/16*
U.S. Cl. 72—389 **9 Claims**

A saw having a deformation extending laterally with respect to the plane of the saw is straightened by placing it on bearing means bearing against one face of the saw on opposite sides of the deformation. Pressure is applied against the deformation on the face of the saw opposite the face against which the bearing means are applied. Sufficient pressure is applied to



bend the deformation into the plane of the saw, without thinning or otherwise altering the saw thickness.

3,729,977
FORMING METHOD AND MACHINE
Alfred E. Motzer, Meriden, and Henry Zollinger, Jr., Cheshire, both of Conn., assignors to Hobson and Motzer, Wallingford, Conn.
Filed April 29, 1971, Ser. No. 138,710
Int. Cl. B21d *43/12*
U.S. Cl. 72—405 **15 Claims**

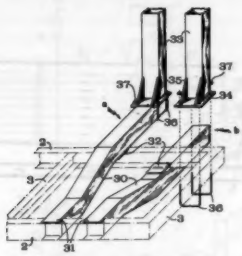


This disclosure relates to the forming of workpieces in a plurality of steps at a plurality of forming stations. The workpieces are carried by recirculating fixtures and intermittently advanced along the work stations. At the work stations, the fixtures are located and held, and a forming operation performed on the workpieces while in the fixture. The fixtures are then advanced to the next work station and the foregoing steps repeated until the workpieces are completely formed and then discharged from the fixtures.

3,729,978
ROAD VEHICLE BENCHES FOR STRAIGHTENING INDENTATIONS IN VEHICLE BODIES
Alipio Lunardini, piazza Betti 46, Marina di Massa, Massa Carrara, Italy
Filed March 12, 1971, Ser. No. 123,775
Claims priority, application Italy, Dec. 18, 1970, 71.211–A/70
Int. Cl. B21j *13/08*
U.S. Cl. 72—457 **3 Claims**

In a thrust member for use on road vehicle benches for straightening indentations in vehicle bodies, comprising an L-shaped beam having an upright portion and a base portion extending transversely of the upright portion, the base portion being applied to the vehicle bench while the upright portion carries means such as a pneumatic ram for exerting a pulling or pushing stress on the vehicle body to straighten the indenta-

tions therein, the improvement comprising means for detachably securing said base portion to said upright portion, means to ensure firm engagement of said base portion with said vehicle supporting bench, and a bend in said base portion to allow it to pass either above or below a longitudinal or



transverse beam of said vehicle supporting bench when the free end of the base portion is brought into engagement with another longitudinal or transverse beam of said vehicle supporting bench, which is spaced from and extends parallel to said first longitudinal or transverse beam.

3,729,979

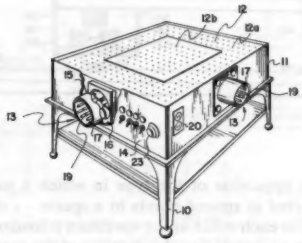
COMBUSTION PRODUCTS GENERATING AND METERING DEVICE

Richard E. Wiberg, Crofton, Md., and John A. Klisch, Alexandria, Va., assignors to The Boeing Company, Seattle, Wash.

Filed May 28, 1971, Ser. No. 147,940

Int. Cl. G01m *19/00*

U.S. Cl. 73—1 R **17 Claims**



An apparatus for generating combustion products at a predetermined fixed rate, mixing the combustion products with air to achieve a given concentration, and distributing the resultant mixture to an area or device to be tested, wherein the apparatus comprises blowers, a holder for the combustion products generating materials (which materials burn at a predictable and controlled rate), a mixing plenum chamber, and means for distributing the air-combustion products mixture.

3,729,980

HYDRODYNAMIC SHOCK SIMULATOR

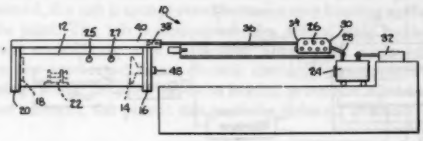
Cameron D. Johnson, Mystic; Gerald M. Mayer, East Lyme, and Roger L. Morency, Voluntown, all of Conn., assignors to The United States of America as represented by the Secretary of the Navy

Filed March 2, 1972, Ser. No. 231,272

Int. Cl. G01n *3/30*

U.S. Cl. 73—12 **6 Claims**

A hydrodynamic shock simulator for providing an underwater explosive shock environment for a sonar transducer under test. The simulator comprises a mechanically driven accelerator which drives a projectile. The moving projectile then hits a piston in a tank full of an incompressible fluid, thus producing a pressure wave of small duration in the tank housing a sonar transducer under test. Any distortion of the pres-



sure wave due to its reflection at the end farther away from the piston is limited by a shock absorber in the end of the tank.

3,729,981

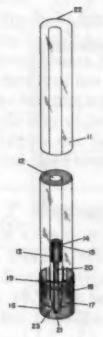
APPARATUS FOR DETERMINING VISUAL PHASE EQUILIBRIA DATA

Guido O. Grady, Tulsa; Everett L. Swalley, Barnsdall, and Sam C. Swift, Tulsa, all of Okla., assignors to Cities Service Oil Company, Tulsa, Okla.

Filed Sept. 17, 1971, Ser. No. 181,501

Int. Cl. G01n *25/02*

U.S. Cl. 73—17 A **1 Claim**



Apparatus is disclosed comprising a capillary tube having piston means contained therein such that the tube may be loaded with a sample system for visual phase equilibria study. Pressure is equalized within and without the capillary tube through movement of the piston for changing volumes required while the temperature remains constant throughout the system.

3,729,982

APPARATUS FOR ACCURATE DETERMINATION OF ABSOLUTE DENSITY OF A FLUID

Osamu Senda, Tokyo, Japan, assignor to Agency of Industrial Science and Technology, Tokyo, Japan

Filed Sept. 10, 1971, Ser. No. 179,326

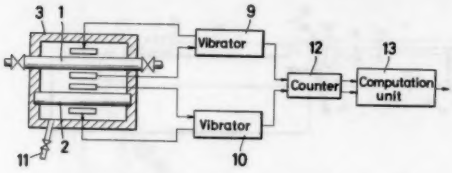
Claims priority, application Japan, Sept. 11, 1970, 45/079229

Int. Cl. G01n *9/00*

U.S. Cl. 73—32 **2 Claims**

In a vacuum vessel, a pipe and a bar which have the same outside diameter and are made of the same material are disposed parallelly to each other, with the ends thereof fixedly fastened to the side walls of the vessel. Said pipe and bar are provided with vibrating means which cause the pipe and the bar to vibrate. The pipe is first vibrated when the pipe interior is devoid of matter. The inside diameter of the pipe is determined indirectly from the consequent frequencies of the pipe and the bar. The pipe is then filled with a fluid whose density is to be determined and it is thereafter vibrated. The absolute

density of the fluid contained in the pipe is directly determined with high accuracy on the basis of the frequency of the



pipe in the packed state and the former frequency of the pipe in the empty state.

3,729,983

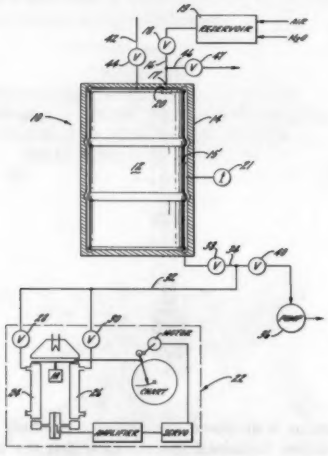
LEAK TIGHTNESS TESTING METHOD AND APPARATUS

Mattheus Johannes Martinus Coppens, Heide-Kalmthout, Belgium, assignor to Inland Steel Company, Chicago, Ill.

Filed Aug. 27, 1970, Ser. No. 67,427

Int. Cl. G01m *3/20*

U.S. Cl. 73—40.7 **11 Claims**



The disclosure relates to methods and apparatus for leak tightness testing of articles such as metal drums wherein the article is placed in a testing enclosure with a detectable gas such as nitrous oxide adjacent one closed side of the article and the space between the other side of the article and the enclosure is evacuated to a pressure lower than the gas pressure on said one closed side of the article. After the test time has passed the entire content of the evacuated enclosure space is flushed to a detector apparatus by an inert gas, preferably air, introduced into the enclosure space at a pressure higher than the pressure to which the space had been evacuated.

3,729,984

APPARATUS FOR TESTING PRESSURIZED CONTAINERS

Richard J. Waldherr, Mannheim-Seckenheim, Germany, assignor to Johann Waldherr OHS, Mannheim, Germany

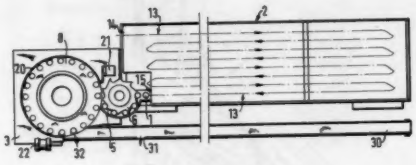
Filed April 24, 1972, Ser. No. 246,643

Claims priority, application Germany, April 26, 1971, P 21 20 348.5; April 6, 1972, P 22 16 556.6

Int. Cl. G01m *3/00*

U.S. Cl. 73—52 **16 Claims**

A succession of pressurized containers are delivered by a conveyor band to a heating station, a rotary feeding wheel receives the containers from the conveyor band in peripheral pockets, and a rotary star wheel is arranged in tangential relationship to the feeding wheel to receive the successive containers in peripheral chambers from the feeding wheel. The containers are held in the chambers, while the chambers are



sealed, until the respective chambers have almost reached the feeding wheel after almost a full rotation of the star wheel, and then the containers are removed from the chambers of the star wheel after their fluid tightness has been tested.

3,729,985

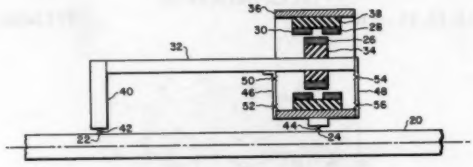
STRAIN GAGE

Charles F. Sikorra, 19715 1st Place S.W., Seattle, Wash.

Filed Feb. 9, 1972, Ser. No. 224,725

Int. Cl. G01b *7/10*

U.S. Cl. 73—88.5 R **10 Claims**



Strain gage apparatus of the type in which a pair of elements, connected at spaced points to a specimen under test, move relative to each other as the specimen is loaded to effect a change in an electrical signal indicative of the magnitude of the strain. Means are provided to maintain relative movement of the aforesaid elements the same and proportional to strain regardless of whether the strain occurs along the axis of the specimen or is due to bending. This is accomplished by inserting pivots or flexures in a specified geometrical pattern in the strain gage configuration to maintain the movable elements of the strain gage coaxial at all times regardless of whether the specimen is subjected to bending or axial loads.

3,729,986

MEASURING AND SERVICING THE DRILLING FLUID IN A WELL

Loren W. Leonard, 8345 Triola, No. 33, Houston, Tex.

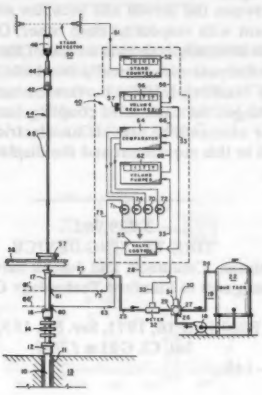
Continuation-in-part of Ser. No. 67,706, Aug. 28, 1970, Pat. No. 3,646,808. This application July 29, 1971, Ser. No. 167,194

Int. Cl. E21b *47/10*

U.S. Cl. 73—155 **11 Claims**

This invention relates to a method and system for detecting the condition of a well. During tripping the drilling fluid in the well is controlled to provide an early warning indication of an abnormality in the well. The volume of solid materials moved during each trip is measured and a corresponding required volume of drilling fluid is determined. A measured volume of

drilling fluid is delivered in order to restore in the well the drilling fluid to a reference level. The required volume is compared with the measured volume to obtain signals which are indicative of the condition of the well.

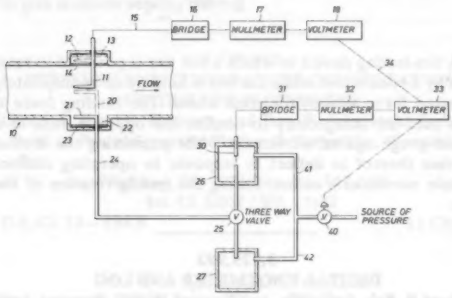


3,729,987

METHOD AND APPARATUS FOR MEASURING SLURRY CONCENTRATION AND VELOCITY DISTRIBUTION IN A SLURRY PIPELINE

Junn-Ling Chao, Pasadena, Calif.; Moye Wicks, III, and Thomas W. Pounds, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Sept. 17, 1971, Ser. No. 181,488
Int. Cl. G01n *15/06*
U.S. Cl. 73—61 R **6 Claims**



A method and apparatus for measuring the slurry concentration and velocity distribution in a pipeline wherein a first probe is used to determine the velocity at a predetermined position in the pipeline and a sample probe is then moved to the position and sampling rate adjusted until the velocity response to the two probes are equal. The local value of the velocity is obtained by dividing volume per unit of time of the sample by the cross-sectional area of the probe while the slurry concentration and particle size distribution are obtained by analysis.

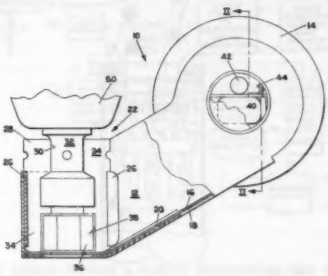
3,729,988

APPARATUS FOR MOUNTING TENSION INDICATORS

Robert I. Swanson, Butler, Pa., assignor to Dake Corporation, Grand Haven, Mich.

Filed Oct. 29, 1970, Ser. No. 84,991
Int. Cl. G01l *5/24*
U.S. Cl. 73—133 **13 Claims**

In an apparatus or device for use with a tool for tightening fastener elements such as bolts, nuts, screws and the like, a socket is rotatably mounted in a housing for receipt of one element of the threaded fastening joint such as the bolt, screw or nut. A guide in the housing positions the tab in alignment with the socket and fastening element so that when the joint is tightened, the tab is compressed between two bearing surfaces in the joint. The tab is comprised of a plastic strip having a current conducting wire embedded along each edge which wires are connected in an electric circuitry mounted in the housing. When the joint has been loaded in tension a predetermined amount, the plastic tab partially deforms and extrudes to establish electrical continuity between the joint and wires to close the circuit thereby signalling pre-load. Further tightening of the joint completely shears the plastic tab and wires to signal that minimum proof load has been reached. A magazine or reel is mounted in the housing to permit continuous and automatic loading of a plurality of tabs collated into a continuous strip. The electric signal can inform the operator or control the tool when the indicated loads are reached.

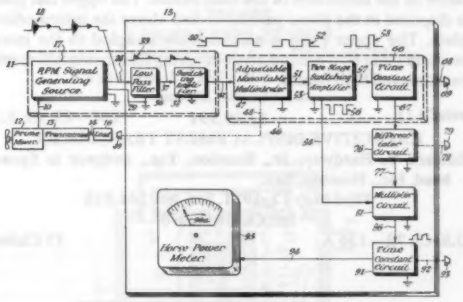


3,729,989

HORSEPOWER AND TORQUE MEASURING INSTRUMENT

Donald R. Little, 132 Chestnut Drive, Greensburg, Pa.

Filed Dec. 10, 1970, Ser. No. 96,725
Int. Cl. G01l *5/13*
U.S. Cl. 73—133 R **13 Claims**



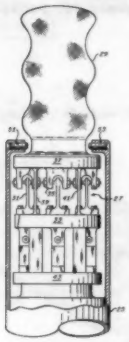
This invention relates to a readily portable apparatus and the related method of determining the useful torque and horsepower wherein the apparatus includes a first unit which provides a velocity signal directly proportional to the velocity of rotation of the prime mover and has as an output a signal indicative of the velocity of rotation of the prime mover. A second unit is coupled to the first unit to provide a signal directly proportional to acceleration. A third unit is coupled to the first and the second units, respectively, and provides an output which is directly proportional to the useful horsepower and torque developed at any given instant during operation of the prime mover.

3,729,990

LOAD CELL FOR AIRCRAFT CONTROL STICK

Kenneth L. Oliver, Phoenix, Ariz., assignor to Sperry Rand Corporation, New York, N.Y.

Filed May 10, 1971, Ser. No. 141,570
Int. Cl. G01l 5/16
U.S. Cl. 73—133 **9 Claims**



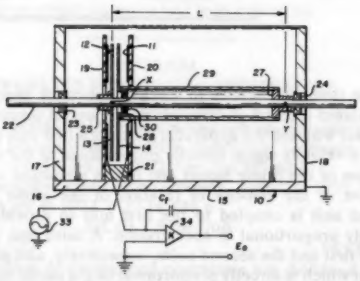
An aircraft control stick contains a load cell for measuring shear forces applied to the stick. The cell includes a flat base plate for mounting the cell in the control stick, an upper plate for receiving the forces applied to the control stick, and an intermediate plate for mounting the force-responsive elements of the cell. The intermediate plate is supported above and parallel to the base plate by a plurality of flat spring flexure members disposed in planes normal to the plane of the two plates and parallel to one another so as to permit relative motion between the two plates only in the direction at right angles to the planes of the spring flexure members. A plurality of flat cantilevered load beams are also mounted on the base plate in planes parallel to the spring flexure members. Yoke members mounted on the intermediate plate straddle the free ends of the load beams so as to contact and deflect the load beams when deflections of the spring flexure members exceed a preset threshold value. Electrical strain gauges in each cantilevered load beam provide electrical output signals representative of the deflection of the load beams. The upper flat plate is disposed in the plane parallel to and above the intermediate plate. The upper plate is mechanically coupled to the intermediate plate by a second array of spring flexure members and cantilevered load beams.

3,729,991

CAPACITIVE DISPLACEMENT TRANSDUCER

Edward V. Hardway, Jr., Houston, Tex., assignor to Spearhead, Inc., Houston, Tex.

Filed May 17, 1971, Ser. No. 144,016
Int. Cl. G01l 3/10
U.S. Cl. 73—136 A **17 Claims**



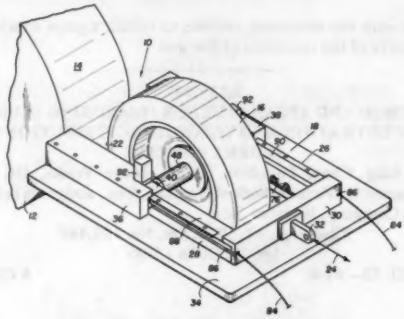
A capacitive displacement transducer for measuring relative displacement between two points or objects is disclosed as including a driven element connected to a source of input electrical signals, a receptor element connected to an electrical output signal circuit means, and two shield elements mounted between the driven and receptor elements for relative movement with respect to each other. One of the shield elements mechanically responds to one of the objects and the other shield element mechanically responds to the other object and any resulting relative movement between the shield elements changes the capacitive coupling between the driven and receptor elements to provide an electrical output signal proportional to this movement and the displacement between said objects.

3,729,992

TIRE-TESTING DEVICE

Jerome Lichtman, Commack, and Joseph Salvi, Bayville, both of N.Y., assignors to Stanford Technology Corp., Woodside, N.Y.

Filed June 16, 1971, Ser. No. 153,635
Int. Cl. G01m 17/02
U.S. Cl. 73—146 **5 Claims**



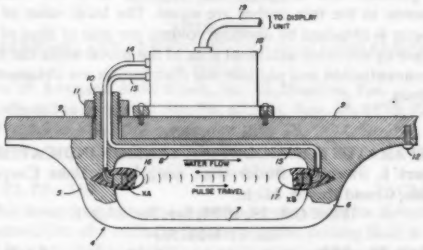
A tire-testing device in which a test tire is powered in rotation by a road wheel while the tire is held by an appropriately directed force against the road wheel. The holding force is also used advantageously to confine the opposite ends of a strain gauge against movement while permitting the medial portion thereof to deflect in response to operating characteristic movements caused during the testing rotation of the tire.

3,729,993

DIGITAL KNOTMETER AND LOG

Calvert F. Eck, Osterville, and Howard H. Hill, Pocasset, both of Mass., assignors to Datamarine International Inc., Pocasset, Mass.

Filed March 8, 1971, Ser. No. 121,869
Int. Cl. G01c 21/10
U.S. Cl. 73—181 **10 Claims**



A digital knotmeter and log for registering the speed of a boat in knots, and its elapsed distance in terms of the integral of its relative velocity through the water, in which the higher

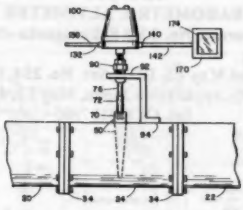
ordered digits of the measurement are independent of the velocity of sound in water and in which the lowest ordered digit is approximated by an internal counter.

3,729,994

FLOW METERING SYSTEM FOR LIQUID WASTES

Henry G. Klug, 2029 N. 67th Avenue, Omaha, Nebr.

Continuation of Ser. No. 56,329, July 20, 1970. This application Feb. 7, 1972, Ser. No. 224,214
Int. Cl. G01f 1/00
U.S. Cl. 73—194 E 24 Claims



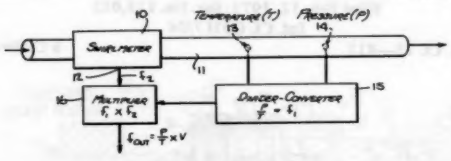
A liquid flow metering system comprising a flow conduit, many of such conduits having a dielectric lining supported for strength by a moisture bearing material such as concrete, the concrete itself often having still other moisture bearing material on the outside of it such as dirt, a capacitive electrode imbedded in or attached to a side wall of the conduit, a dielectric medium disposed between the capacitive electrode and the moisture-bearing concrete, dirt or other material, the dielectric medium being disposed on the side of the capacitive electrode which faces away from the center of the conduit to prevent the capacitive electrode from sensing the moisture in the concrete, dirt, or other moisture-bearing material whereby the capacitive electrode senses only liquid in the conduit so as to give accurate sensing thereof.

3,729,995

PRESSURE AND TEMPERATURE COMPENSATION SYSTEM FOR FLOWMETER

Laszlo I. Kovacs, Hatboro, and Roy F. Schmoock, Ivyland, both of Pa., assignors to Fischer & Porter Co., Warminster, Pa.

Filed Aug. 26, 1971, Ser. No. 175,082
Int. Cl. G01f 1/00, 15/02
U.S. Cl. 73—194 B 11 Claims



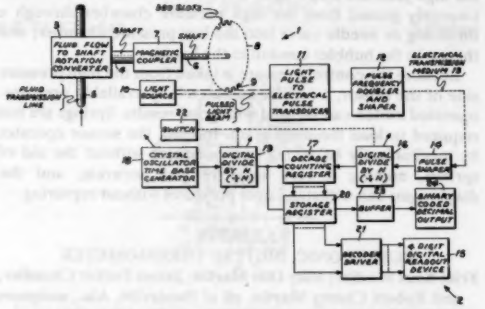
A pressure and temperature compensation system for a gas flowmeter yielding a pulsatory signal whose frequency is a function of flow rate, which signal is affected by changes in the pressure and temperature of the gas being measured. The system includes sensors generating signals proportional to prevailing values of pressure and temperature, the pressure signal being divided by the temperature signal in a divider-converter adapted to produce a variable duty-cycle signal whose duty cycle is proportional to the quotient of the applied signals. The variable duty-cycle signal is multiplied by the pulsatory flowmeter signal, the product thereof being an output signal whose frequency is directly proportional to volumetric flow corrected with respect to both the temperature and pressure.

3,729,996

AVERAGING DIGITAL RATE INDICATOR

Thomas R. Metz, Haddonfield, N.J., assignor to Conoflow Corporation, Blenheim, N.J.

Filed Sept. 16, 1971, Ser. No. 180,958
Int. Cl. G01f 1/00
U.S. Cl. 73—194 E 14 Claims



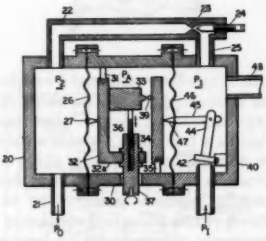
Electric pulses having a widely fluctuating rate to be measured are divided by a factor n ranging between 2 and 9, inclusive. A time base generator produces pulses having a constant rate defining a given period of time during which the measurement would normally be made if the rate of the electric pulses to measured were constant. The pulses from the time base generator are also divided by N having a value equal to the division factor of the electric pulses. A counter counts the number of electric pulses during the multiplied given period of time. The contents of the counter are then transferred to a digital readout device the reading of which is the average rate of the widely fluctuating rate measure during the multiplied give period of time. The given period of time is selected so that the readout device will present a direct visual reading in units of measure per unit of time, such as gallons per hour for a fluid. The rate fluctation of the electric pulses may be proportional to the rate fluctuation of a quantity being measured, such as fluid flow, fluid consumption or revolutions of an engine.

3,729,997

LIQUID LEVEL SENSOR

Owen B. Luke, 51 Mitchell Road, Cape Elizabeth, Maine

Filed Dec. 27, 1971, Ser. No. 212,163
Int. Cl. G01f 23/16
U.S. Cl. 73—302 11 Claims



A device of the gas-bubbling type for determining the level of a body of liuqid comprises a dual-diaphragm, multiplying lever arrangement whereby the pressure necessary to effect bubbling is multiplied or amplified to a higher pressure which can be read directly as hydrostatic head and/or used to operate a control switch.

The sensor comprises two chambers, one at a low and the other at a high pressure. Each chamber has like diaphragms

exposed to ambient pressure and connected by a lever mechanism whereby the movement of the low pressure diaphragm causes an opposite and greater movement of the high pressure diaphragm. The low pressure chamber receives the pressure necessary to effect bubbling through a conduit placed in the body of the liquid, the level of which is to be measured. The high pressure chamber receives instrument air (or other control gas) through a regulating valve operated by the high pressure diaphragm, and a small amount of air is continuously passed from the high pressure chamber through a throttling or needle valve into the low pressure chamber, and thence to the bubbler conduit in the liquid.

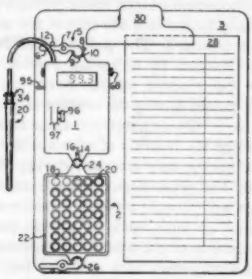
Because the control pressure is taken from the high pressure side of the sensor, a regular commercially available pressure-operated switch can be used with good results. Springs are not required to load the diaphgram. Instead, the sensor operates by mechanically balancing two pressures without the aid of springs, making it very sensitive and accurate, and the diaphragms can withstand over pressures without rupturing.

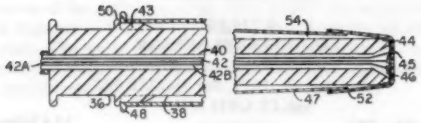
3,729,998

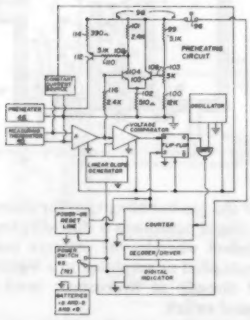
ELECTRONIC, DIGITAL THERMOMETER

Fritz Kurt Mueller; Billy Otis Martin; James Parker Chandler, and Robert Cherry Martin, all of Huntsville, Ala., assignors to Royal Medical Corporation, Huntsville, Ala.

Filed Aug. 10, 1970, Ser. No. 62,481
Int. Cl. G01k 7/24, 1/08
U.S. Cl. 73—362 AR **34 Claims**







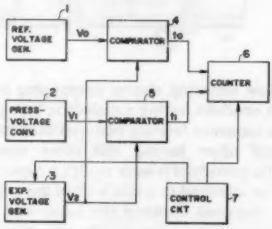
An electronic thermometer having a probe for insertion into the mouth or other cavity where temperature is to be measured; disposable probe sheaths that are easily assembled with and removed from the probe; an electronics system comprising means for preheating the mouthward end of the probe, thus achieving very quick temperature measurement; and a digital temperature indicator. The invention includes means for quickly disengaging the disposable sheath from the probe and means for supporting the assembly on a nurse's hospital board or from a neck strap. The electric circuitry receives power from batteries that are permanently fixed to a removable and quickly replaceable bottom (back) cover of the case.

3,729,999

BAROMETRIC ALTIMETER

Naonobu Shimomura, No. 13-8 Sakuragaoka-cho, Shibuya-ku, Tokyo, Japan

Filed May 12, 1972, Ser. No. 254,784
Claims priority, application Japan, May 12, 1971, 46/31858
Int. Cl. G01l 7/00
U.S. Cl. 73—384 **18 Claims**



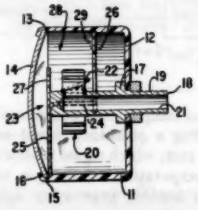
Apparatus is disclosed for comparing the magnitude of an exponentially changing signal with time respectively with that of a signal proportional to the atmospheric pressure at a reference altitude and that of a signal proportional to the atmospheric pressure at the altitude to be measured; further, their respective times of coincidence are measured. The altitude can then be measured because this time difference is proportional to the difference between the altitude to be measured and the reference altitude and, furthermore, the accurate altitude can be measured executing a correction of the temperature distribution.

3,730,000

STEPPED DIAL PRESSURE GAUGE

Ralph D. Waite, Sellersville, Pa., assignor to Ametek, Inc., New York, N.Y.

Filed Feb. 12, 1971, Ser. No. 115,015
Int. Cl. G01l 7/04
U.S. Cl. 73—411 **6 Claims**



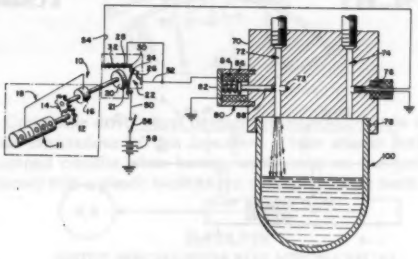
A pressure gauge of the Bourdon tube type, especially useful in conjunction with fire extinguishers, has a diametrically extending step in its dial face with a central opening in the step and the Bourdon tube positioned in this opening. A pointer on one end of the Bourdon tube extends at right angles thereto and moves in the space between a viewing window of the gauge and the dial face rear portion which is spaced inwardly

from the window. The pointer is bendable so as to be adjustable.

3,730,001
AUTOMATIC WORKING LIQUID SAMPLER FOR PROVIDING LIQUID SAMPLES FOR SPECTROGRAPHIC WEAR ANALYSIS

Richard Rohland Goodwin, 8604 Battailles, Annandale, Va.

Filed Feb. 8, 1972, Ser. No. 224,458
Int. Cl. G01r 1/10
U.S. Cl. 73—422 R **7 Claims**

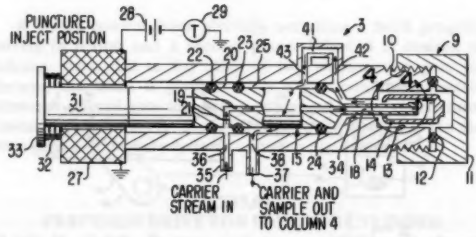


A system which takes a sample of a working liquid in a machine for subsequent study, such as by spectrographic analysis. The sample is taken after a predetermined amount of machine usage has accumulated. The system comprises accumulating means for recording machine usage and providing a control output which activates a sampling means to take a sample of the working liquid. Delay means are preferably incorporated to assure that the sample is representative of the overall condition within the machine of the working liquid being so sampled.

3,730,002
SAMPLE INTRODUCTION SYSTEM FOR A FLUID CHROMATOGRAPH

James R. Penton, Oakland, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed June 24, 1969, Ser. No. 836,069
Int. Cl. G01n 1/22
U.S. Cl. 73—422 GC **3 Claims**

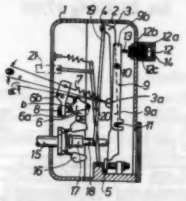


A gas chromatograph system wherein a sample filled capsule is inserted into the system through an airtight lock. The sample capsule is punctured by a puncture tube in fluid communication with the carrier stream. The carrier stream passes through the tube and flushes the sample material from the capsule into the chromatographic column for separation and analysis.

3,730,003
RPM REGULATOR FOR INTERNAL COMBUSTION ENGINES, PARTICULARY ENGINES FOR AGGREGATES

Takuji Isomura, Kariya, Aichi Pref., Japan, assignor to Nippondenso Co. Ltd., Kariya-shi, Aichi-ken, Japan

Filed Sept. 22, 1971, Ser. No. 182,762
Claims priority, application Japan, Sept. 28, 1970, 45/84812
Int. Cl. F02d 31/00
U.S. Cl. 73—541 **5 Claims**

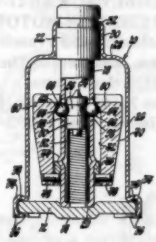


In an rpm regulator for an internal combustion engine settable to two operational rpm's for obtaining two different current frequencies from a generator driven by said engine, in order to ensure that the P-degree of the regulator remains the same, there is provided an auxiliary regulator spring which, in an arbitrary manner, is connectable to the rpm regulator to combine with a main regulator spring for one of the operational rpm's.

3,730,004
SENSOR

Walter Cwycyshyn, Detroit, and Elwyn L. Kitchen, Jr., Troy, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed April 23, 1971, Ser. No. 136,880
Int. Cl. G01p 15/02
U.S. Cl. 73—514 **5 Claims**



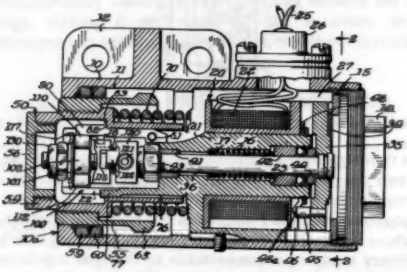
A sensor includes a base plate and a generally vertically extending tubular guide provided intermediate the ends thereof with two diametrically opposed radial openings. A firing pin is slidably mounted within the guide and is spring biased toward one end of the guide to an actuated position wherein the pin engages a cartridge to fire the cartridge and actuate an inflatable cushion of an occupant restraint system. An annular seismic mass surrounds the guide and is pivotally supported thereon for movement about an axis transverse of the guide axis and direction of movement of the operator. The mass axis is further coplanar with the axis of the openings in the guide. The mass includes a pair of diametrically opposite axially and radially directed shoulders having grooves which open to the guide openings and cooperate with an annular groove on the firing pin to trap respective balls therebetween and detent the firing pin against movement. The balls are freely received within the guide openings. When the mass receives an acceleration pulse of predetermined amplitude and time directed angularly and preferably normal to the axis thereof, it

swings about the axis to move the grooves thereof out of engagement with the balls and permit the firing pin spring to move the firing pin to actuated position as the balls move outwardly of the guide openings.

3,730,005
ELECTROMECHANICAL ACTUATOR

Hans U. Hjermstad, Chicago, and Carl J. Kopp, Arlington Heights, both of Ill., assignors to C. P. Clare & Co., Chicago, Ill.

Filed Dec. 20, 1971, Ser. No. 209,896
Int. Cl. G05g 17/00
U.S. Cl. 74—2 **10 Claims**

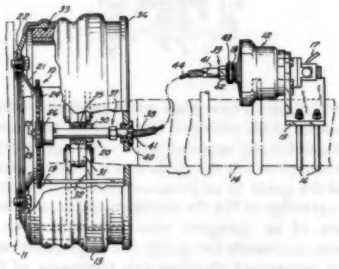


An energy-storing and release mechanism usable to actuate bomb shackle release devices and the like. The mechanism includes a plunger capable of forcibly moving from a cocked position to a released position in response to a control signal from actuating means. Locking means are provided to respond to the actuating means and to releasably lock the plunger in the cocked position to prevent accidental release of the plunger as a result of shock loads having a substantial rotational force component.

3,730,006
GEAR DRIVE ASSEMBLY FOR ANTI-WHEEL LOCK-UP CONTROL SYSTEMS IN MOTOR VEHICLES

Robert B. Price, Manchester, and Francis W. Stager, Stafford Springs, both of Conn., assignors to The Jacobs Manufacturing Company, West Hartford, Conn.

Filed June 7, 1971, Ser. No. 150,294
Int. Cl. F16h 37/00
U.S. Cl. 74—13 **6 Claims**



A gear drive assembly for use in an anti-wheel lock-up control system to transmit rotation of a wheel of a motor vehicle to a control device. One embodiment includes gearing connected with the drum and confined within its interior having connection by means of a flexible casing and drive shaft with an externally located control device.

In a second embodiment including the flexible casing and shaft, the gearing is arranged adjacent the open end of the drum.

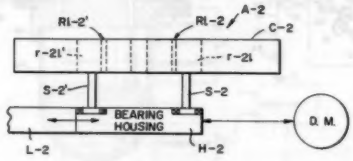
In a third embodiment, the flexible casing and shaft is omitted and the control device is connected directly with the gearing located adjacent the open end of the drum.

In each embodiment, a dust cover arrangement over the open end of the drum protectively guards the drum and gearing against entry of foreign matter.

3,730,007
ROLAMITE

Charles K. Wellington, Nashua, N.H., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 30, 1969, Ser. No. 1,907
Int. Cl. F16h 27/02
U.S. Cl. 74—89.2 **8 Claims**

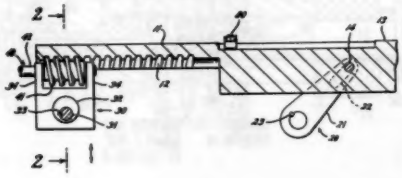


Improvement features in "rolamite" type precision rolling suspension are taught, such a "rolamite" being known in the art as comprising cylindrical rollers held captive within a roller cage, between the S-shaped bends of a roller band therein. These features relate to "double rolamites" particularly involving two pairs of such rollers and especially "linear rolamites" adapted for unidirectional motion. Other features include arranging a plurality of rolamite/cage assemblies in a single operative combination; adapting a rolamite cage as part of an actuated load structure; arranging one, or several, "-drive-magnets" along the roller-track of a rolamite assembly for prescribed magnetic attraction of the rollers and, thus, the magnetic incrementing thereof; and providing an array of detect-cells along such a roller-track to monitor incremental movements of the band and roller assembly.

3,730,008
DISENGAGEABLE SLIDE NUT

John M. Sheesley, Houston, Tex., assignor to Research Engineering Company, Houston, Tex.

Filed May 27, 1971, Ser. No. 147,419
Int. Cl. F16h 27/02
U.S. Cl. 74—89.15 **7 Claims**



A device for translating rotary motion of one member into linear motion of another. It includes a rotating member, such as a screw, which is removably engageable with a threaded partial nut. On engagement, screw rotation causes linear nut movement. This movement may be used to control motion of further devices.

3,730,009

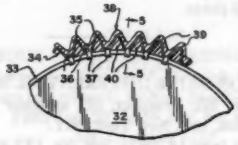
COMPOSITE DRIVE WHEEL

Robert H. Mead, and George A. Zimmer, both of Ithaca, N.Y., assignors to Borg-Warner Corporation, Chicago, Ill.

Continuation of Ser. No. 884,094, Dec. 11, 1969, abandoned, which is a continuation-in-part of Ser. No. 678,831, Oct. 30, 1967, abandoned. This application Dec. 15, 1971, Ser. No. 208,495

Int. Cl. F16h *55/06, 55/14, 55/30*

U.S. Cl. 74—243 R **5 Claims**



Composite drive wheel devices are disclosed herein to provide illustrations of this invention. These wheels include a stamped circular plate having tooth roots on the periphery thereof with a plastic toothed rim molded over the tooth roots.

3,730,010

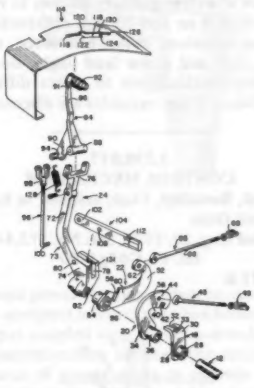
SHIFT MECHANISM FOR MECHANICAL TRANSMISSIONS

Josef F. Prokop, Addison, Ill., assignor to International Harvester Company, Chicago, Ill.

Filed Sept. 30, 1971, Ser. No. 185,107

Int. Cl. G05g *5/10*

U.S. Cl. 74—477 **8 Claims**



A single control lever pivotally actuating a latch progressively in a first and a second plane. When it is desired to change from one to the other of two transmission gear set levers, the latch is pivoted from a gap contained therein through a fixed gate into a gap contained in the other transmission gear set lever. The shift being possible only when the two gaps and the gate define a common plane.

3,730,011

PRECISION DRIVE FOR PRINTING CYLINDER

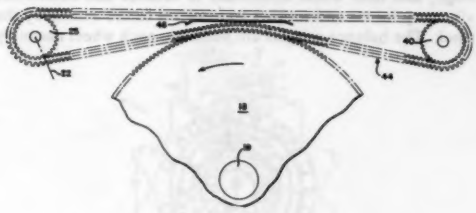
Lysle D. Cahill, Dayton, and George William Denlinger, Franklin, both of Ohio, assignors to The Mead Corporation, Dayton, Ohio

Filed July 9, 1971, Ser. No. 161,225

Int. Cl. F16g *1/100*

U.S. Cl. 74—221 **4 Claims**

A precision rotary drive for a printing cylinder includes a toothed belt having outer and inner teeth, the outer teeth engaging a toothed driven wheel to the printing cylinder, with the wheel having the same number of teeth as the outer teeth on the belt, and a power driven smaller toothed wheel engaging the teeth on the interior of the belt. The belt is constructed



initially of one piece, and split longitudinally and the parts moved longitudinally with respect to each other in order to have teeth formed from like parts of material spaced longitudinally from each other in the separate sections.

3,730,012

SPEED-CHANGE MECHANISM FOR A BICYCLE

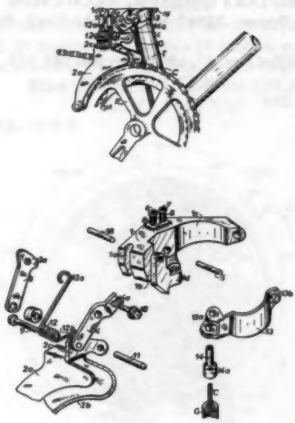
Lucien Charles H. Juy, 75 rue General Fauconnet, Dijon, France

Filed June 7, 1971, Ser. No. 150,395

Claims priority, application France, June 8, 1970, 7020893

Int. Cl. F16h *7/08*

U.S. Cl. 74—242 **11 Claims**



A speed change mechanism for a bicycle comprises a displaceable fork connected by a parallelogram linkage to a casing which can be fixed to the frame of the bicycle. The linkage includes a pair of levers, the first of which is connected to a control cable while the second is engagable with a pair of stops to limit the movement of the fork in opposite directions. The casing is a one-piece plastic body with a groove to receive the major portion of the second lever, the latter having a flattened end which selectively engages one of two screws projecting into the groove and serving as the stops.

3,730,013

DYNAMICALLY BALANCED POWER TRANSMISSION

Arthur J. Slemmons, Los Gatos, Calif., assignor to FMC Corporation, San Jose, Calif.

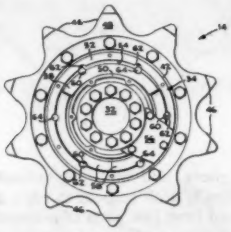
Division of Ser. No. 849,404, Aug. 12, 1969, Pat. No. 3,578,822. This application Oct. 19, 1970, Ser. No. 81,707

int. Cl. F16h *55/30;* **F16f** *15/22;* **B62d** *55/08*

U.S. Cl. 74—243 FC **5 Claims**

A rotating power transmission member engaged with a segmented power transmission means is balanced to counteract

vibratory torques and forces by three tuned pendulum balance weights spaced 120° apart. A specific application is to a crawler vehicle with tuned pendulums in the track drive, bogey and idler wheel assemblies to balance and counteract vibratory forces and torques transmitted to the wheels by the track. The balance weights are built into each wheel assembly



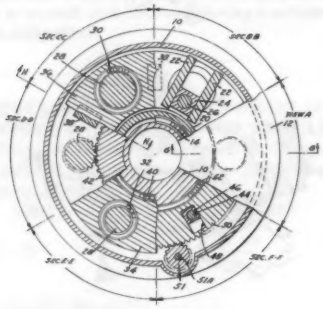
and are tuned to the same order as the number of teeth on the track drive wheel so that the balance weights produce counterforces and countertorques, per revolution, equal to those from the number of track segments, per revolution, causing the imbalance forces and torques. In the case of the idler and bogey wheels, the tuning order is the effective pitch circumference divided by the track pitch.

3,730,014

ROTARY INDEXING MECHANISM

John Henry Brems, 32867 White Oaks Trail, Birmingham, Mich.

Filed Dec. 17, 1971, Ser. No. 209,319
Int. Cl. F16h *57/10*
U.S. Cl. 74—394 **11 Claims**



A multiple step rotary indexing machine which is used for indexing a rotary table around an axis. A stationary reaction member such as an internal gear or a sun gear is surrounded by a plurality of planetary gears having an input shaft on one side and an output shaft on the other side. Radial slide members or links connect the input shafts to a rotary power input and similar members connect the output shafts to the rotary table such that a constant input speed can produce a suitably accelerated and decelerated output with a selected dwell period at a selected angle on the rotation.

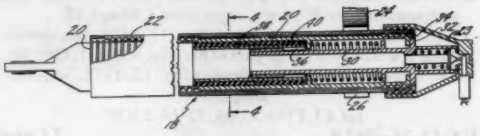
3,730,015

TORSIONAL ELASTOMER SNUBBER

Robert W. Cornell, West Hartford, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed Sept. 16, 1971, Ser. No. 181,127
Int. Cl. F16h *1/18*
U.S. Cl. 74—424.8 R **6 Claims**

The torsional energy of a rotational member occasioned by its deceleration to a complete stop is absorbed by an elastomer



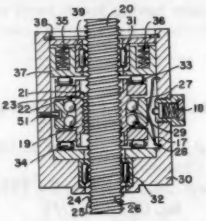
sandwiched between concentric shafts such that the elastomer is placed in radial shear.

3,730,016

FRICTION DRIVE DIFFERENTIAL SCREW

Donald E. Miller, Mt. Prospect, Ill., assignor to Continental Can Corporation, Inc., New York, N.Y.

Filed June 14, 1971, Ser. No. 152,937
Int. Cl. F16h *1/18, 55/18*
U.S. Cl. 74—424.8 B **33 Claims**



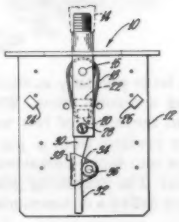
A machine for converting rotary motion to rectilinear motion which machine is an anti-friction differential screw. This machine utilizes variations in nut bias force, thread profile, pitch diameter, nut and screw lead angle, double nuts and variations of the combinations to effect different rates of travel per revolution. Other variables are discussed.

3,730,017

CONTROL MECHANISM

Arlyn G. Liddell, Bountiful, Utah, assignor to Eaton Corporation, Cleveland, Ohio

Filed Aug. 20, 1971, Ser. No. 173,440
Int. Cl. G05g *9/00*
U.S. Cl. 74—471 R **7 Claims**



A control mechanism for an electrical apparatus includes a frame member, a handle pivotably mounted on the frame member and adapted to be manually grasped for operating the control mechanism. The control mechanism includes first and second electrical control means. The first electrical control means is operably associated with the control handle and adaptable to provide one polarity of output signal in response to movement of the control handle in one direction from an initial neutral position and the opposite polarity of output signal in response to movement of said control handle in the opposite direction from the neutral position. The control

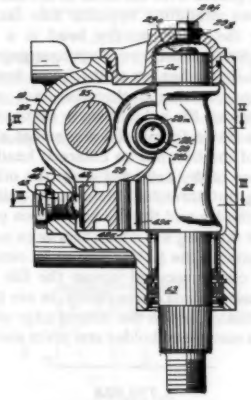
mechanism further includes a linkage means connected between the control handle and the second electrical control means whereby the second electrical control means will be operated in the same direction and to the same extent for a given amount of movement of the control handle in either direction from the neutral position thereby enabling the second electrical control means to be adapted to regulate the magnitude of output signal of the control mechanism irrespective of the direction of control handle movement.

3,730,018

TORQUE-BALANCED STEERING SYSTEM

Arthur E. Bishop, and Richard E. Henrich, both of Barrington, Ill., assignors to Arthur E. Bishop, Barrington, Ill.

Filed Jan. 29, 1970, Ser. No. 6,747
Int. Cl. B62d *1/20*
U.S. Cl. 74—498 **3 Claims**



An improved power steering system for automotive vehicles employing a compact integral gear box having a variable ratio steering output coupled with a torque-matching geared variable ratio interconnection between the steering output shaft and the source of power assist to provide substantially improved on-center turn rate capability, improved on-center feel, and increased torque availability in the parking range. Substantially increased steering system efficiency is provided while, at the same time, a low-cost gear construction is incorporated.

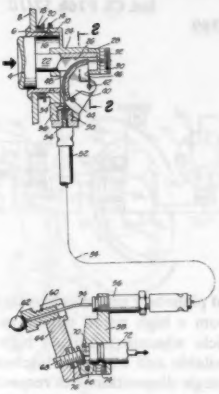
3,730,019

AIRCRAFT SEAT LOCK ACTUATOR

Charles U. Ballard, 4253 Lenox Boulevard, Inglewood, Calif.

Filed July 14, 1971, Ser. No. 162,411
Int. Cl. F16c *1/18*
U.S. Cl. 74—502 **9 Claims**

A device for transmitting motion and force to actuate a slave element and more particularly to remotely operate a trigger for an airplane seat lock or the like including a push button, a flexible element for transmitting the force exerted on the push button to a remote trigger actuator, including means for translating linear movement of the push button in one path to movement of the flexible element in another path at an



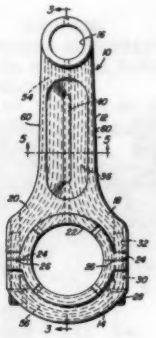
angle to the linear path, and also to convert the push exerted on the push button to a pull exerted on the flexible element.

3,730,020

CONNECTING ROD AND CAP CONSTRUCTION

Vincent J. Di Matteo, Sr.; Bartolo Di Matteo, and Vincent J. Di Matteo, Jr., all of 7415 8th Avenue, Los Angeles, Calif.

Filed Oct. 13, 1971, Ser. No. 188,867
Int. Cl. F16c *7/00*
U.S. Cl. 74—579 E **8 Claims**



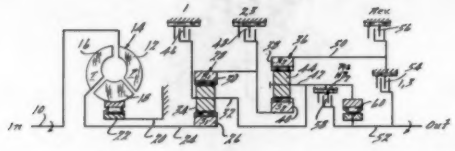
An aluminum connecting rod including an elongated shank portion having wrist pin bearing defining means at one end and a removable cap portion at the other end. The cap portion and adjacent end of the elongated shank portion coact to define a bearing bore and include opposing parting surfaces disposed on opposite sides of the bore with at least one elongated tension member extending between each pair of opposing parting surfaces and clamping the cap to the adjacent end of the shank. The opposite side outer boundary surfaces of the cap and shank portions defining the aforementioned bearing bore include generally radial oil relief grooves, the shank portion includes a center longitudinal oval passage communicating the bearing bore and the wrist pin bearing defining structure and the shank portion includes a central longitudinal zone thereof through which the aforementioned oil passage extends and which tapers in at least one transverse dimension away from the aforementioned bearing bore.

3,730,021

INLINE TRANSMISSION FOR HIGH SPEED ENGINES

Thomas R. Stockton, Ann Arbor, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 3, 1971, Ser. No. 204,526
Int. Cl. F16h 57/10
U.S. Cl. 74—759 **2 Claims**



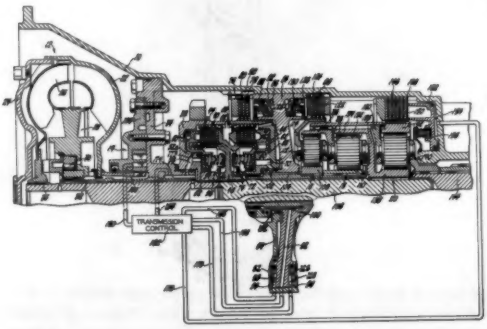
A simplified planetary gear mechanism for distributing driving torque from a high speed engine to the driveshaft of a wheeled vehicle wherein relatively high torque multiplying ratios are available and wherein clutches and brakes are arranged in strategic disposition with respect to simple planetary gear elements to provide uniformly stepped ratios from the lowest ratio to a high ratio with a simplified engagement and release pattern, the high ratio being substantially greater than unity, and wherein a minimum number of friction torque establishing devices is required.

3,730,022

POWER TRANSMISSION

John J. O'Malley, Livonia, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed March 7, 1969, Ser. No. 805,190
Int. Cl. F16h 57/10
U.S. Cl. 74—759 **8 Claims**



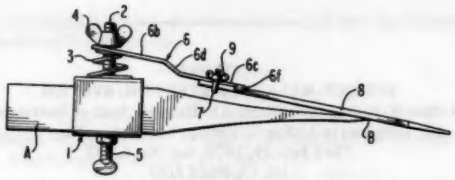
This disclosure relates to a transmission providing four forward drive ratios, neutral and reverse wherein all changes of forward drive ratio other than changes to direct drive are accomplished simply by release of one brake and application of a second brake. Three planetary gear units and two brakes are located in the housing rearwardly of a support web and two clutches and one brake are located forwardly of the support web. Change of ratio to direct drive is accomplished by release of a brake and engagement of a clutch. All clutches and brakes are of the disc type to eliminate the need for band adjustment. In the gearing, the planet carriers of two of the gear units and ring gear of one unit are fixed for rotation as a unit with the output shaft, the sun gears of two units are fixed to each other, and the sun gear of one unit and ring gear of another unit are fixed to each other.

3,730,023

AXE SHARPENING DEVICE

Lloyd W. Otto, 2317 South Hampton, Springfield, Mo.

Filed Jan. 26, 1972, Ser. No. 220,874
Int. Cl. B24b 3/40
U.S. Cl. 78—82 **11 Claims**



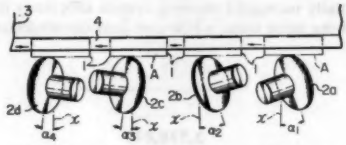
A device for sharpening axe heads comprising a generally U-shaped frame placed over the head of the axe with opposite legs of the frame straddling opposite side faces of the axe head. Securing the frame to the head is a thumb screw threaded through one of the frame legs to engage one side face of the axe head. The other leg of the frame has an elongated aperture therein receiving a threaded bolt which in turn receives an elongated file holder arm to mount the same relative to the main frame for pivotal movement about the bolt. The inner end of the bolt has an enlarged head engaging the adjacent side face of the axe head while the other end of the bolt has a wing nut threaded thereon. A coil compression spring between the leg and the file holder arm yieldably urges the latter against the wing nut which acts as an adjustable stop. The file is mounted to the holder arm as an extention thereof by a U-shaped clamp secured across the file by wing nuts received on threaded studs of the clamp. In use the file may be grasped and oscillated across the cutting edge of the axe head as the file and its associated holder arm pivot about the bolt.

3,730,024

SAW MANUFACTURE

Shigetsugu Takigawa, 18 Kyukencho Nishi 2-cho, and Masuhiko Takigawa, 12 Kyukencho Nishi 2-cho, both of Sakai City, Osaka, Japan

Filed Oct. 20, 1971, Ser. No. 190,718
Claims priority, application Japan, Oct. 20, 1970, 45/94813
Int. Cl. B23d 65/02
U.S. Cl. 76—112 **9 Claims**



A method is provided for the manufacture of saws made of band steel plates having an extended trapezoidal cross-section. The plates are preliminarily quenched and plated prior the saw manufacture. A set of four thin disc grinding stones arranged in respective predetermined inclination, when positioned against one edge of the band steel plate, completes the process of blade shaping and edge forming simultaneously in a single operation.

3,730,025

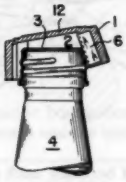
GRIPPER FOR UNSCREWING CAPS

Walter Monnerjahn, Manzer Strasse 89, 6509 Gau-Odernheim, Germany

Filed May 28, 1971, Ser. No. 148,094

Int. Cl. B67b *67/00*

U.S. Cl. 81—3.4 **5 Claims**



A gripper for unscrewing caps from bottles and the like being substantially disc-shaped and palm-sized and having a conical socket therein. The gripper may comprise a resilient material and have a metal knife edge mounted to project into the socket.

3,730,026

RING-STYLE CAP OPENER

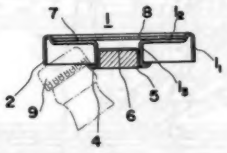
Haruo Matsumoto, Amagasaki, Japan, assignor to Matsumoto Metal Company Limited, Amagasaki-shi, Japan

Filed Jan. 21, 1972, Ser. No. 219,617

Claims priority, application Japan, March 10, 1971, 46/16155

Int. Cl. B67b *7/16*

U.S. Cl. 81—3.46 R **3 Claims**



A ring-style cap opener has a ring-shaped sheet metal element including outer peripheral portion and a top portion. A cylindrical portion depends from the center of the top portion. The lower edge of each of the outer peripheral portion and the cylindrical portion are bent toward each other, the lower edge of the outer peripheral portion lying above the edge of the cylindrical portion. The bent lower edge of the outer peripheral portion acts as a fulcrum, and the bent edge of the cylindrical portion engages under the flared edge of the crown cap for removing a cap from the bottle.

3,730,027

ADJUSTABLE TRUCK WRENCH SUPPORT

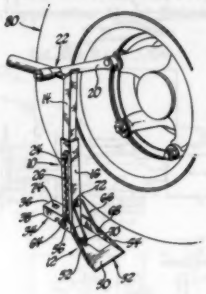
Donald M. Rohn, 16823 Huntington, Detroit, Mich.

Filed May 18, 1971, Ser. No. 144,480

Int. Cl. B25b *13/58*

U.S. Cl. 81—180 R **6 Claims**

A stand for supporting the shaft of a lug wrench so that relatively high forces may be imposed on wheel nuts without twisting the wrench off the nuts includes a pair of telescoping tubular members having a cradle for the wrench at one free end and a foldable base at its other free end. A pin projecting from the telescoped end of one of the members engages a longitudinal slot in the other member so as to adjust the effective length of the support. The foldable base consists of a pair of plates with bent edges, each having a set of ears pivotably mounted to the tubular member forming the lower end of the support. In use, the base plates extend laterally in opposite directions from the support. A wire bale affixed to one of the plates engages a projection on the side of the support to maintain it in position and an edge surface of the other plate abuts the opposite side of the support to maintain that plate in extended position. One of the plates has a cut-away section which allows the other plate to fold therein so that both plates may lie against the same side of tubular member when folded.



3,730,028

MULTIPLE SPINDLE AUTOMATIC LATHE

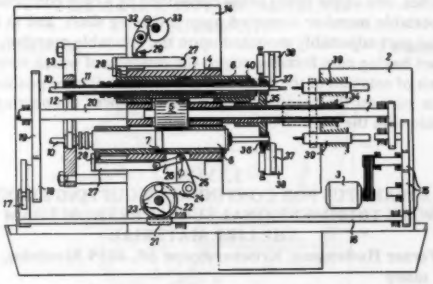
Hermann Flisch, Eichholz, Maienfeld, Switzerland, assignor to Eunipp, AG, Zug, Switzerland

Filed Nov. 27, 1970, Ser. No. 93,152

Claims priority, application Switzerland, Dec. 3, 1969, 18,101/69

Int. Cl. B23b *9/10*

U.S. Cl. 82—3 **10 Claims**



Multiple spindle automatic lathe having means for enabling axial movement of the spindles in the spindle carrier and means for enabling automatic movement thereof.

3,730,029

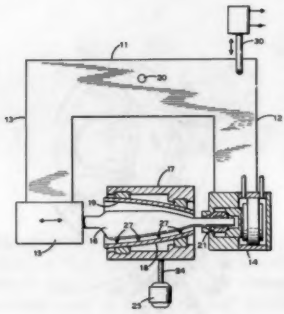
PRECISION BORING MACHINE

Forest E. Block, 4892 Spring Brook Road, Rockford, Ill., and Kenneth E. Peterson, 822 Hawthorne Avenue, Rockford, Ill.

Filed Nov. 1, 1971, Ser. No. 194,312

Int. Cl. B23b *5/40*

U.S. Cl. 82—12 **4 Claims**



A machine for use in precision boring of elongated workpieces.

3,730,030

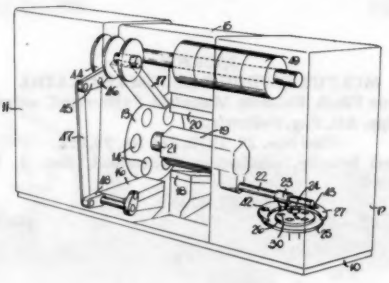
AUTOMATIC LATHES

Harold James Gilbert, Coventry, and Reginald John Dixon, Solihull, both of England, assignors to Wickman Machine Tool Sales Limited, Coventry, England

Filed Nov. 14, 1969, Ser. No. 876,956

Int. Cl. B23b *21/00*

U.S. Cl. 82—21 R **7 Claims**



An automatic machine having a plurality of tool carrying slides, one of the slides being controlled by a cam comprising a rotatable member mounted upon a driving shaft, and at least one part adjustably mounted upon the rotatable member, said part having cam forming edges, the distance of which from the axis of rotation of the shaft varies with the adjusted position of the part on the member, and a cam follower connecting the slide with the cam.

3,730,031

APPARATUS FOR CONTINUALLY CUTTING BLANKS WITH TRIDIMENSIONAL SURFACES FROM FOAM OR THE LIKE MATERIAL

Werner Huttemann, Krischerstrasse 80, 4019 Monheim, Germany

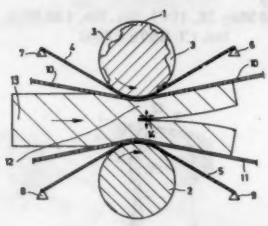
Filed Aug. 17, 1971, Ser. No. 172,512

Claims priority, application Germany, Oct. 16, 1970, P 20 50 845.6

Int. Cl. B26d *3/28*

U.S. Cl. 83—4 **7 Claims**

Apparatus for cutting tridimensional surfaces from foam or like material in which the foam is compressed by two vertically adjustable rollers in the cutting area and moved relative to a cutter. At least one of such rollers is provided with a shaped casing or circumferential surface, and a flexible conveyor belt is interposed between each of the rollers and the foam material for pulling the foam material through the cutting area.



3,730,032

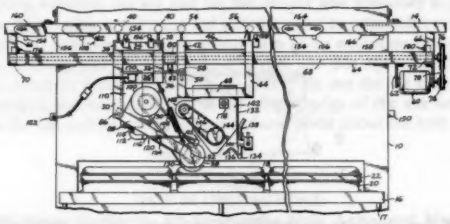
BREAD AND PASTRY PROCESSING APPARATUS

Edward I. Marckx, Portland, and Harvey F. Stines, Gresham, both of Oreg., assignors to Stinemark Corporation, Gresham, Oreg.

Division of Ser. No. 824,723, April 17, 1969, Pat. No. 3,614,933, and a continuation of Ser. No. 639,343, May 18, 1967, abandoned. This application July 29, 1970, Ser. No. 64,847

Int. Cl. B26d *3/08*

U.S. Cl. 83—11 **1 Claim**



Apparatus for splitting, water-spraying and seeding the upper surfaces of bakery products preliminary to baking them is mounted directly in front of the oven. It includes a track, a carriage, and a carriage drive for moving the carriage across the bakery products. Mounted on the carriage are cutters, a spray, and a seeder arranged, respectively, for splitting, spraying, and seeding the upper surfaces of the bakery products. These units work during a continuous passage of the carriage across the oven door. The processed products then may be introduced immediately into the oven for baking.

3,730,033

METHOD TO CONTROL THE FEEDING AMOUNT IN BAND SAWING MACHINES

Tsuneo Aizawa, Isehara, Japan, assignor to Amada Co., Ltd., Tokyo, Japan

Division of Ser. No. 710,839, March 6, 1968, Pat. No. 3,575,074. This application Jan. 18, 1971, Ser. No. 107,162

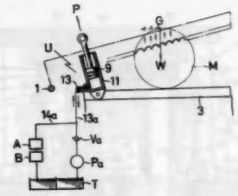
Claims priority, application Japan, June 12, 1967, 42/37241

Int. Cl. B26d *1/46*

U.S. Cl. 83—13 **4 Claims**

Method to control the feeding amount in hydraulically controlled band sawing machines having a pivotable frame which supports the band saw, and a hydraulic cylinder for lifting and lowering the frame with respect to the material to be cut, comprising a hydraulic pressure control means for cylinder, valve

means (preferably with a knife-edge shaped outlet) for controlling the quantity of hydraulic fluid reaching the cylinder,



and at least one hydraulic connection, namely between the outlet of the control means and the inlet of the valve means.

3,730,034

CUT-OFF DEVICES FOR CONTINUOUS ROD-MAKING MACHINES

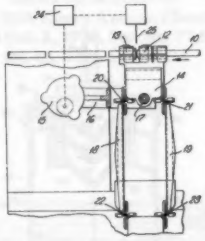
Edward George Preston, Deptford, London, England, assignor to Molins Limited, London, England

Filed May 24, 1971, Ser. No. 146,037

Claims priority, application Great Britain, May 26, 1970, 25,192/70

Int. Cl. B26d *1/56*

U.S. Cl. 83—38 **11 Claims**



In a cut-off device for a continuous rod making machine, in which the rod is supported during cutting by a reciprocating ledger, the cut is timed so that it takes place either completely before or completely after the ledger reaches its peak velocity.

3,730,035

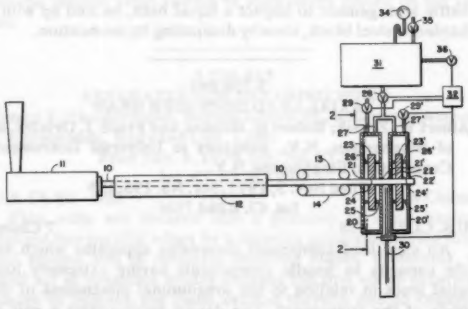
CUTTING TUBULAR PLASTIC EXTRUSION

Mahesh Bhatia, Woodside, N.Y., assignor to Anchor Plastics Company, Inc., Long Island City, N.Y.

Filed Oct. 12, 1971, Ser. No. 188,360

Int. Cl. B26d *3/16*

U.S. Cl. 83—54 **4 Claims**



The disclosure relates to a process and apparatus for cutting extruded plastic tubes while avoiding excessive distortion of the tubes wherein a fluid pressure differential is created between the inside and outside of the tube on both sides of the cutting knife so as to keep the tube from collapsing under the pressure of the knife.

3,730,036

DEVICES FOR APPLYING FORCES

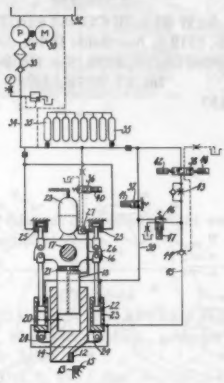
Bela Istvan Bathory, Yorkshire, England, assignor to Davy and United Engineering Company Limited, Sheffield, England

Filed Feb. 2, 1971, Ser. No. 111,996

Claims priority, application Great Britain, Feb. 4, 1970, 5,399/70

Int. Cl. B26d *5/08*

U.S. Cl. 83—554 **9 Claims**



A shear comprises two co-operating force-applying members such as blade holders with a shear blade, one of the members is coupled to a short stroke reciprocatable drive member such as a rotary eccentric and a crosshead, and one of the members is connected to a variable spacing device which is in the form of at least one piston and cylinder, the cylinder is sealed off during movement of the drive member in one direction and the cylinder is permitted to move relative to its piston in the reverse direction of movement of the driving member so that a workpiece can be cut in a series of shearing operations.

3,730,037

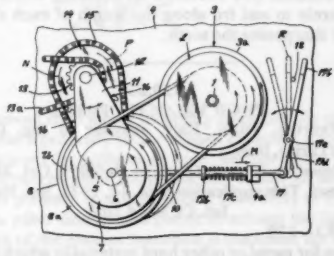
REVERSIBLE TRANSMISSION, ESPECIALLY FOR FIELD HARVESTERS

Josef Purrer, Gottamadingen, Germany, assignor to Maschinenfabrik Fahr A G, Gottmadingen, Germany

Filed March 8, 1971, Ser. No. 121,939

Int. Cl. B26d *5/10*

U.S. Cl. 83—68 **7 Claims**



A reversible transmission, especially for the pickup, feed and/or drums of a field harvester, in which a pair of fixed shafts from input and output members of the transmission and

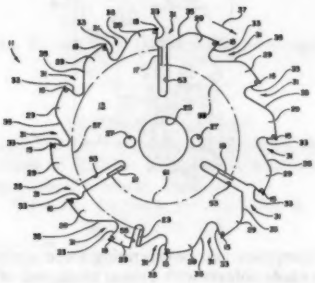
a further shaft is mounted upon a support swingable about the axis of one of the shafts. This intermediate or swingable shaft carries a V-belt pulley which may be connected with the V-belt pulley of the other fixed shaft when the intermediate shaft is urged away from the latter to tension the belt. A pair of friction wheels on this intermediate shaft and on the other shaft are brought into engagement when the intermediate shaft is swung in the other direction. The wheels of the intermediate shaft are connected operatively to a wheel of the first-mentioned shaft about which the support is swingable.

3,730,038

SAW BLADE CONSTRUCTION

Joseph L. Farb, 1519 E. Northside Drive, Jackson, Miss.

Filed Dec. 3, 1970, Ser. No. 94,665
Int. Cl. B27b *33/08*
U.S. Cl. 83—837 4 Claims



A saw blade intended to be mounted on an arbor and rotatably driven thereby. The saw blade includes tungsten carbide tipped teeth; however, these tips are brazed into unique pockets or recesses providing structure that substantially precludes the heretofore hazardous possibility of the teeth being broken loose from the blade or separated from the braze. The saw blade further includes several tungsten carbide side cutting teeth spaced in a unique staggered arrangement about the blade at different distances radially from the center thereof to assure against pinching of the blade when sawing green lumber or the like, and cooling slots which obviate cracked and/or warped blades by allowing for expansion and contraction of the steel blade. It is within these cooling slots that the side cutting teeth are fixedly received in a manner which facilitates free access of an abrading wheel for movement therein to and fro along the length of each side cutting tooth for sharpening the teeth.

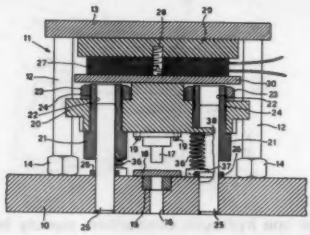
3,730,039

HIGH VELOCITY PRESS

Renzo Fedrigo, Turin, Italy, assignor to Ing. C. Olivetti, Ivrea (Turin), Italy

Continuation-in-part of Ser. No. 869,059, Oct. 24, 1969, abandoned. This application Sept. 14, 1971, Ser. No. 180,367
Int. Cl. B26d *5/08*
U.S. Cl. 83—170 11 Claims

Presses for metal or other hard material in which the driving power for the punch is derived primarily from the kinetic energy of the punch element and the supporting structure moving at high speed. Capacitive discharge through a coil produces an electromagnetic interaction with a conductive plate adjacent to the coil and secured to the punch element to achieve the high velocity and therefore the desired kinetic



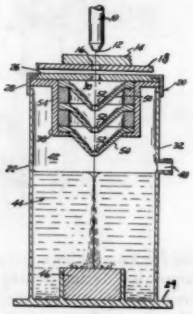
energy, which energy is transformed to mechanical punching force.

3,730,040

ENERGY ABSORBER FOR HIGH PRESSURE FLUID JETS

Ray F. Chadwick, Troy, and John H. Robertson, Detroit, both of Mich., assignors to The Bendix Corporation, Southfield, Mich.

Filed Aug. 17, 1971, Ser. No. 172,530
Int. Cl. B26f *1/26, 3/00*
U.S. Cl. 83—177 14 Claims



A device is disclosed for absorbing the energy of a fluid cutting jet after it has passed through the workpiece in order to reduce the sound level as well as the spray and vapor normally accompanying the fluid jet cutting process. The device includes a baffle arrangement disposed immediately adjacent the workpiece and enclosed in a housing to receive and contain the jet after it has passed through the workpiece so as to prevent the sonic energy and spray from emanating into the surrounding environment. The jet itself is directed through the baffle arrangement to impact a liquid bath, backed up with a hardened steel block, thereby dissipating its momentum.

3,730,041

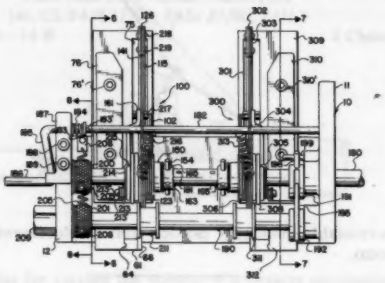
AXIAL LEAD DISPENSER HEAD

Albert W. Zemek; Robert H. Holmes, and Frank J. Orzelek, all of Binghamton, N.Y., assignors to Universal Instruments Corporation, Binghamton, N.Y.

Filed Nov. 3, 1971, Ser. No. 195,253
Int. Cl. B26d *7/06*
U.S. Cl. 83—278 7 Claims

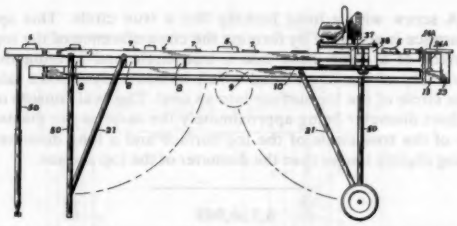
An axial lead component dispensing apparatus which has the capacity to handle components having extremely long axial leads in relation to the longitudinal dimensions of the body of the component. The device incorporates a pair of notched feeder blades which are reciprocal to advance rolls of taped components. The feeder blades and accompanying

components are transversely adjustable along a feed shaft from which the feeder blade gets its reciprocal motion and



which also powers a cutter shaft to sever the leads below the feeder portion of the apparatus.

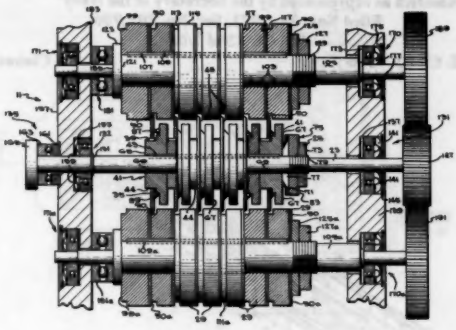
3,730,042
SAWING MACHINE
Ira Emmet Price, 13606 Emery Avenue, Cleveland, Ohio
Filed Oct. 2, 1970, Ser. No. 77,566
Int. Cl. B27b *5/20, 9/04*
U.S. Cl. 83—471.3 **3 Claims**



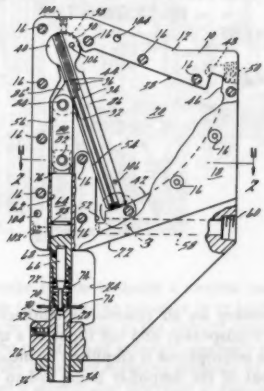
A portable sawing machine having a sawing table and hinged saw guide tracks adapted to movably retain a normally hand-held, portable, motor-driven saw thereon for rapid and precise angular cross-cutting of workpieces placed on the table.

3,730,043
APPARATUS FOR SHEARING WEBS
Ernest F. Zimmermann, Buffalo Grove, Ill., assignor to Ampex Corporation, Redwood City, Calif.
Filed Nov. 9, 1970, Ser. No. 87,890
Int. Cl. B23d *19/06*
U.S. Cl. 83—502 **6 Claims**

Thin webs are sheared into a plurality of strips having straight line parallel edges by a shearing apparatus having first and second sets of rotatable shearing blades. Preferably, a third set of rotatable blades engages the first set of shearing blades to balance the loads exerted thereon due to engagement with the second set of blades. Individual springs bias the first set of blades to slide longitudinally along a support shaft to compensate for wear and to maintain a preloaded and forcible engagement between the shearing blades. Preferably, the second set of blades have shearing surfaces harder than shearing surfaces on the first set of blades so that wear predictably occurs on the first set of blades.



3,730,044
FLUID OPERATED APPARATUS
Edwin G. Sawdon, Marysville, Mich., assignor to BTM Corporation, St. Clair, Mich.
Filed Oct. 8, 1971, Ser. No. 187,645
Int. Cl. B26d *5/12*
U.S. Cl. 83—513 **23 Claims**



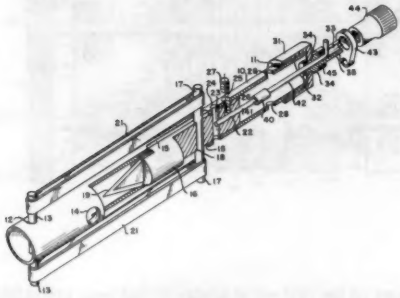
An improved fluid motor including a rotationally oscillating piston within a generally sector-shaped chamber, a reciprocating ram element for performing work, linkage means interconnecting the ram element and piston, and means for supplying a fluid under pressure to said chamber, selectively to either one side or the other side of said piston to actuate the latter. The fluid motor of the present invention is disclosed, for exemplary purposes, embodied in an improved punching machine. The motor and machine are so constructed and are of such a configuration that a number of them may be stacked or mounted side by side to provide punching or other operations on very close centers.

3,730,045

PROGRAMMED CORD CUTTER

Michael L. Greene, Hillcrest Heights, and Theodore R. Waugh, Bladensburg, both of Md., assignors to The United States of America as represented by the Secretary of the Navy

Filed Nov. 24, 1971, Ser. No. 201,906
Int. Cl. B26d *5/08*
U.S. Cl. 83—580 **4 Claims**



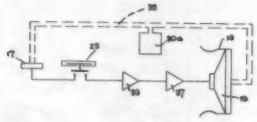
A device for cutting a cord at any ocean depth in order to release buoys, floats, corers, mines etc. The device includes a knife blade which is held in place by a release mechanism in a loaded position which upon release forces the knife blade through the cord to release a pay load.

3,730,046

ORALLY OPERATED ELECTRONIC MUSICAL INSTRUMENT

Larry A. Spence, 6433 West 86th Place, Los Angeles, Calif.

Filed Feb. 14, 1972, Ser. No. 225,732
Int. Cl. G10m *3/00*
U.S. Cl. 84—1.05 **10 Claims**



Means forming an air channel is connected between the output of a loudspeaker and the input of a microphone. The output of the microphone is amplified by means of an amplifier, the output of the amplifier being fed to the speaker, an acoustical feedback path thus being formed between the speaker and the microphone. A mouthpiece is connected in this acoustical path such that an operator can determine the frequency of the feedback signal by adjusting the size of his oral cavity, thus forming musical tones.

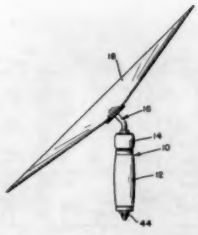
3,730,047

CYMBAL HOLDER

Albert R. Casavant, Box 1124, Chattanooga, Tenn.

Filed July 20, 1972, Ser. No. 273,413
Int. Cl. G10d *13/08*
U.S. Cl. 84—402 **9 Claims**

A handle or holder for playing and spinning a cymbal includes a non-rotatable handgrip portion and a rotatable portion adapted to be revolved by the thumb and forefinger. The cymbal is secured to a rod which extends through and is fixed to the handle rotatable portion and which extends through the non-rotatable handgrip portion for displacement relative thereto.

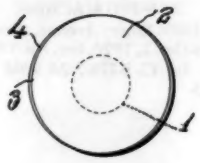


3,730,048

SCREW WITH A HEAD LOOKING LIKE A TRUE CIRCLE

Jujiro Okada, No. 69, Chodo-1-chome, Higashi-Osaka City, Japan

Filed May 25, 1971, Ser. No. 146,623
Claims priority, application Japan, June 11, 1970, 45/50925
Int. Cl. F16b *23/00*
U.S. Cl. 85—45 **1 Claim**



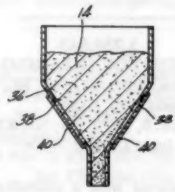
A screw with a head looking like a true circle. This appearance is achieved by forming the circumference of the top surface of a screw head into a true circle and forming the periphery of the screw head which immediately follows said true circle of the top surface into an oval. The oval consists of a short diameter being approximately the same as the diameter of the true circle of the top surface and a long diameter being slightly longer than the diameter of the top surface.

3,730,049

SAFETY SYSTEM FOR EXPLOSIVE POWDER STORAGE BIN

Eugene A. Andrew, Florissant, Mo., assignor to Olin Corporation, New Haven, Conn.

Filed June 25, 1971, Ser. No. 156,858
Int. Cl. F42b *33/00, 37/00*
U.S. Cl. 86—1 **5 Claims**



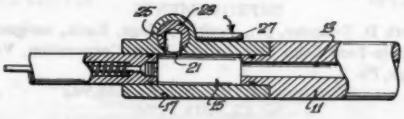
Prevention of deflagration of explosive powder from developing into a detonation within a storage chamber is accomplished by venting pressure from within the storage chamber so that the critical mass detonation rate of burning of the powder can never be reached.

3,730,050

VARIABLE VOLUME FIRING CHAMBER

Morris Goldin, Orange, and Gerson M. Jacobson, Downey, both of Calif., assignors to Hughes Tool Co., Aircraft Division, Culver City, Calif.

Filed June 5, 1970, Ser. No. 43,735
Int. Cl. F41f *17/00*; F41c *21/00, 21/12*
U.S. Cl. 89—14 R **4 Claims**



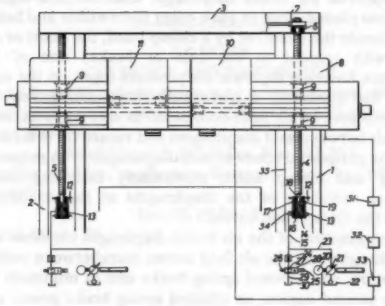
Apparatus for varying the volume of a firearm combustion chamber to alter the impulse so as to allow the firearm operator to select a level of impulse appropriate to the range and mode of firearm utilization. The firing chamber volume may be increased either by placing the chamber in communication with a sub-chamber or by enlarging the chamber in an axial direction by withdrawal of a portion of the breech section.

3,730,051

SUPPORT ADJUSTING DEVICE

Ernst Hatzig, Siegen, Germany, assignor to H. A. Waldrich G.m.b.H., Siegen, Germany

Filed Jan. 13, 1970, Ser. No. 2,477
Int. Cl. B23b *97/26*
U.S. Cl. 90—15 **1 Claim**



A device is used for correcting the bearing of transverse carriers of single post and double post machine tools with tool holders movable upon the carriers. The device is particularly characterized by electrical or hydraulic tensioning devices which engage lower ends of spindles. These tensioning devices exert a force which varies depending upon the load of the ends of spindles by the support location and amplify it to a constant total tension.

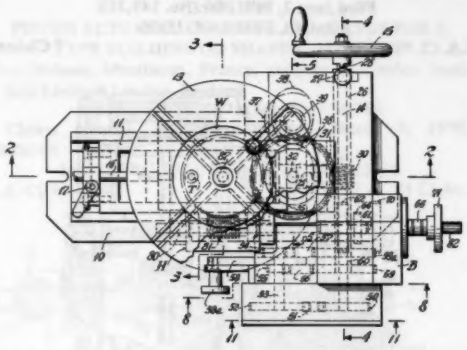
3,730,052

CAM GENERATING DEVICE

Paul L. Harlin, 46 Pumpkin Delight Road, Milford, Conn.

Filed Dec. 28, 1971, Ser. No. 212,953
Int. Cl. B23c *1/14, 3/08*
U.S. Cl. 90—20 **8 Claims**

Apparatus for generating cam surfaces comprising a slide movable with respect to a fixed base and having a rotatable workpiece carriage thereon and an adjustable eccentric pin for moving the slide in a predetermined relation to the rotation of the workpiece to generate, by selective gearing, harmonic and non-harmonic cam surfaces on the workpiece as desired.

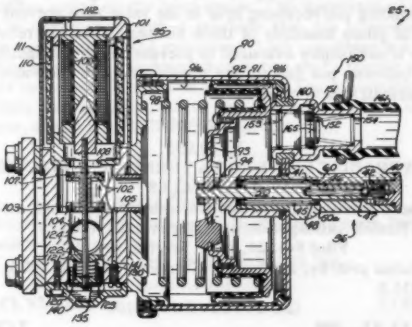


3,730,053

ANTI-SKID BRAKE CONTROL AND ACTUATOR ASSEMBLY

Claude M. Trocme, Birmingham, Mich., assignor to Eaton Yale & Towne Inc., Cleveland, Ohio

Division of Ser. No. 805,155, March 7, 1969, Pat. No. 3,586,386. This application May 5, 1971, Ser. No. 141,060
Int. Cl. F15b *13/04*
U.S. Cl. 91—469 **1 Claim**

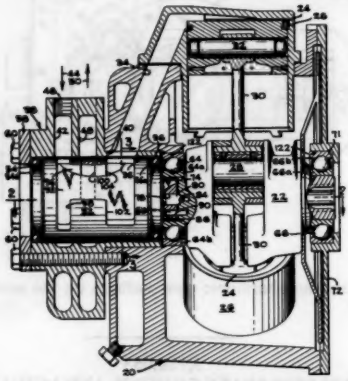


An anti-skid brake system includes a control and actuator assembly operable to relieve the pressure in at least a portion of the brake system in response to the vehicle encountering a skid condition. The control and actuator assembly includes an actuator unit having a control member movable to relieve the brake pressure and a servomotor operable to effect the movement thereof. The servomotor includes a pressure operated member having a normal position and which is movable therefrom in response to a pressure differential acting on the opposite sides thereof. The pressure operated member is connected with the control member so that these members move together. A control valve controls the pressure on one side of the pressure operated member and applies atmospheric pressure to the one side of the pressure operated member when the pressure operated member is in its normal position. The control valve is operable in response to the receipt of a skid signal to apply a vacuum to the one side of the pressure operated member. A pressure responsive valve controls the pressure on the other side of the pressure operated member and is responsive to movement of the pressure operated member.

3,730,054
AIR MOTOR

Bryan J. Dickinson, Zenith, Wash., assignor to FMC Corporation, San Jose, Calif.

Filed June 2, 1971, Ser. No. 149,310
Int. Cl. F01b *1/06, 13/06*
U.S. Cl. 91—491 7 Claims

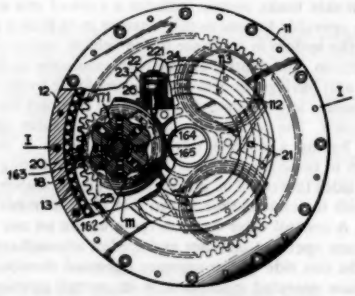


A driving connection between the rotary valve and crankshaft of an air motor comprising a tang on the valve and a driving groove on the crankshaft. A resiliently compressive element is provided between the valve tang and crankshaft groove to preload the valve and crankshaft outwardly against their respective supporting bearings and prevent lateral shifting of these elements due to lateral exhaust air impulses on the rotary valve. An index pin in the crankshaft groove and a corresponding pin receiving hole in the valve tang prevent 180° out of phase assembly of these elements. The pin receiving hole is sufficiently oversized to prevent any driving action by the indexing pin due to any misalignment of the valve and crankshaft axes of rotation.

3,730,055
HYDRAULIC DRIVE FOR A TURNING CONNECTION WITH BALLS

Wilhelm Schluter, Dortmund-Gartenstadt, Germany, assignor to Hoesch Aktiengesellschaft, Dortmund, Germany

Filed Feb. 24, 1971, Ser. No. 118,278
Claims priority, application Germany, Feb. 26, 1970, P 20 08 931.0
Int. Cl. F01b *1/06, 13/06*
U.S. Cl. 91—498 7 Claims

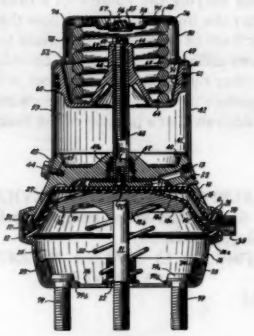


A hydraulic drive for a rotary connection for use in connection with implements having a rotatable upper part and a non-rotatable lower part, in which the rotatable housing means of radial piston motor means are arranged in a chamber defined by inner ring means adapted to be connected to the non-rotatable lower part and by outer ring means adapted to be connected to the rotatable outer part while said housing means has outer teeth meshing with teeth of said inner ring means, and while said outer ring means comprises conduit means adapted to be connected to a source of pressure fluid and communicating with the interior of said radial piston motor means.

3,730,056
DOUBLE DIAPHRAGM BRAKE OPERATOR IMPROVEMENTS

Kenneth D. Swander, Jr., Prairie Village, Kans., assignor to Certain-Teed Saint Gobain Insulation Corporation, Valley Forge, Pa.

Filed June 14, 1971, Ser. No. 148,942
Int. Cl. F01b *19/00*
U.S. Cl. 92—48 9 Claims



An improved air brake diaphragm chamber, having two diaphragms placed close to each other therewithin and held in position inside the chamber by a clamp band, the outer or outboard (with respect to the axle or brake) one of said diaphragms having a separate air pressure input on the outer shell of the chamber, a perforated ring spacing said two diaphragms with an air inlet connected to said perforation for feeding air between said diaphragms and means for effectively sealing the peripheral zones of said diaphragms with respect to said ring and clamp band, particularly including means preventing extrusion of the diaphragms at the connection points of the clamp band halves.

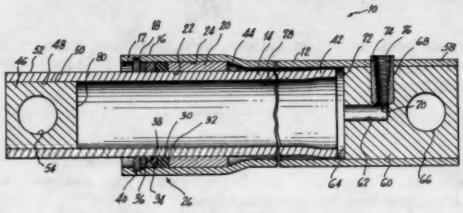
The combination of the air brake diaphragm chamber with two diaphragms and the air feed means therebetween with, as a first option, an outboard spring brake unit of minimum size and, as a second option, an inboard spring brake power unit, in all cases access readily provided to both the power spring unit and the diaphragm chamber.

An improved air brake diaphragm chamber, having two diaphragms placed close to each other therewithin and held in position inside the chamber by a clamp band, the outer or outboard (with respect to the axle or brake) one of said diaphragms having a separate air pressure input on the outer shell of the chamber, the inboard one of said diaphragms having a central opening or perforation therethrough, the brake actuating rod in operative connection with said diaphragm and connected thereto, said brake operating rod hollow whereby fluid pressure may be input between said diaphragm through said brake operating rod, and means for effectively sealing the peripheral zones of said diaphragms with respect to said clamp band, particularly including means preventing extrusion of the diaphragms at the connection points of the clamp bands halves.

An improved air brake diaphragm chamber, having a single diaphragm therewithin held in position inside the chamber by a clamp band, and means for effectively sealing the peripheral zones of said diaphragm with respect to said clamp band, par-

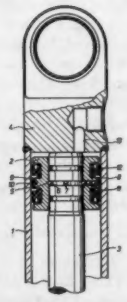
ticularly including means preventing extrusion of the diaphragm at the connection points of the clamp band halves.

3,730,057
HYDRAULIC RAM ASSEMBLY
John Frederick Friden, Warren, N.J., assignor to MFG Manufacturing Co., Martinsville, N.J.
Filed May 3, 1971, Ser. No. 139,556
Int. Cl. F01b 31/00; F16j 11/02; B23p 15/00
U.S. Cl. 92—110 18 Claims



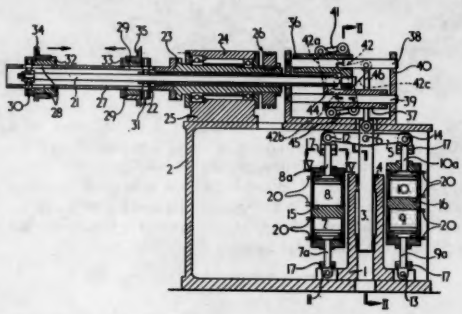
A hydraulic ram is assembled from a first tubular member having a plug inserted in fluid tight relation in one end thereof and a second tubular member, defining the actuator rod of the ram, mounted for reciprocation in the first tubular member with one end thereof adjacent the plug and the other end thereof extending beyond the open end of the first tubular member. A second plug member is inserted in the exposed end of the actuator rod in fluid tight relation therewith and seal means is mounted in the first tubular member adjacent its open end to prevent fluid loss during reciprocation of the actuator. The plug in the actuator rod defines a piston surface therein against which fluid supplied to the ram assembly, through a port in the first mentioned plug, acts to extend the actuator rod.

3,730,058
CYLINDER AND PISTON UNIT
Heinz Siegel, Bietigheim-Buch, and August Kraisel, Bittenfeld, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany
Filed May 11, 1971, Ser. No. 142,261
Claims priority, application Germany, July 11, 1970, G 70 26 240.7
Int. Cl. F01b 29/00
U.S. Cl. 92—128 7 Claims



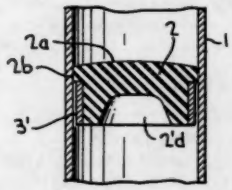
A piston is guided for movement in a cylinder and has a piston rod which is coupled with the piston via a pair of juxtaposed grooves provided in the piston and in a portion of the piston rod to define between themselves an enclosed channel in which spherical retaining members are accommodated, with an opening being provided which communicates with this channel and permits the introduction and removal of the spherical members.

3,730,059
PISTON ACTUATED CONTROL APPARATUS FOR A TYPE BUILDING OR SHAPING MACHINE
Noel Nebout, Montlucon, France, assignor to Dunlop Holdings Limited, London, England
Filed March 15, 1971, Ser. No. 124,268
Claims priority, application France, March 9, 1970, 7008348
Int. Cl. F01b 9/00; F16h 21/44; B60c 25/14
U.S. Cl. 92—140 11 Claims



A pneumatically or hydraulically operated control apparatus comprising a slide, at least two piston and cylinder assemblies and a lever means. This slide transmits movements from the apparatus, imparted to it by the piston and cylinder assemblies acting on the lever means. This apparatus may be used in conjunction with a machine that has components which require controlled movement. Such a machine is a tire building or shaping machine wherein two shafts require controlled movement in opposite directions. The movements of the slide can be imparted to the shafts by various lever systems, of which the following is a specification.

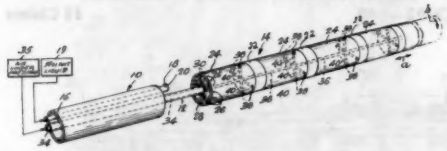
3,730,060
FLOATING PISTONS
Christian Bourcier DeCarbon, 64 Boulevard Maurice Barres, Neuilly-sur-Seine, France
Filed Oct. 26, 1970, Ser. No. 83,708
Int. Cl. F16j 1/00
U.S. Cl. 92—249 2 Claims



The piston is of metal reinforced elastomeric material of substantially cup-shaped configuration having its base of a thickness resilient to ballooning or excessive flexure under pressure, and being of a diameter slightly greater than the internal diameter of the cylinder in which it moves. The base having true cylindrical marginal bearing surfaces bounded by sharply angular axial edges and constituting only a relatively small portion of the total height of the piston. The greater portion of the axial extent of the piston is comprised by an annular flange portion of only slightly less diameter than that of the

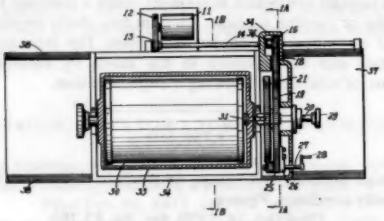
cylinder, the flange portion serving as a guiding means for installing the piston and being reinforced by a tubular metal piece which also abuts a portion of the base of the piston.

3,730,061
AIR BEARING ANVIL
Alistair K. Bodycomb, Baie D'Urfe, Quebec, Canada, assignor to Domtar Limited, Montreal, Canada
Filed Nov. 30, 1970, Ser. No. 93,793
Int. Cl. B31b *1/28*; B31c *1/00*; B31b *1/14*
U.S. Cl. 93—59 MT **3 Claims**



The invention provides a new cutter anvil attached to a winding mandrel for the making of spirally wound tubes. The tubes wound on the mandrel are transferred onto the cutter anvil to be cut to size. The anvil contains apertures openings outwardly and arranged in a ring about its leading end, and air under pressure is blown through these apertures to support the tube placed on the anvil for cutting.

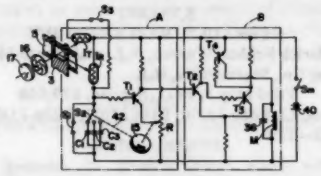
3,730,062
PHOTO-TYPESETTING APPARATUS FOR MUSICAL NOTES
Nobuo Morisawa, Hoygo, Japan, assignor to K. K. Morisawa Shashin Shokujiki Seisakusho, Osaka, Japan
Filed Feb. 8, 1971, Ser. No. 113,196
Int. Cl. B41b *21/32*
U.S. Cl. 95—4.5 R **3 Claims**



A photo-typesetting apparatus for musical notes, wherein key buttons for selecting steps of an arbitrary number, a control unit and a pulse signal generating unit are connected to a pulse motor, which works cooperatively with a magazine drum of photo-typesetting machine, and by the selective operation of said key buttons, a sensitive material on the magazine drum is put in position for photo-typesetting.

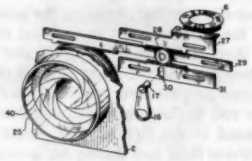
3,730,063
DUAL LIGHT-RESPONSIVE AUTOMATIC EXPOSURE CONTROL APPARATUS
Tatsuo Kobayashi, Kaizuka, and Hiroshi Ueda, Nara, both of Japan, assignors to Minolta Camera Kabushiki Kaisha
Filed May 11, 1971, Ser. No. 142,156
Claims priority, application Japan, May 11, 1970, 45/39878
Int. Cl. G03b *7/08*
U.S. Cl. 95—10 CT **11 Claims**

Automatic exposure control is effected by measuring light passing through the objective lens both before and during exposure by using a combination of two light measuring elements. One light measuring element is mounted to receive light reflected from either a light shield member or the surface of the film and the other light measuring element is mounted behind the film and is responsive to light transmitted through the film during exposure. A switch enables selection of the



one, or combination of the two, light measuring elements to account for the difference in reflection coefficients of different films.

3,730,064
QUENCH CONTROL CALCULATOR
Dean M. Peterson, Fort Washington, Pa., assignor to Honeywell Inc., Minneapolis, Minn.
Filed Dec. 6, 1971, Ser. No. 204,868
Int. Cl. G01j *1/52*
U.S. Cl. 95—10 C **7 Claims**

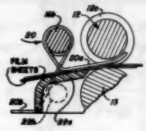


A first selection device selectively designates a power level to be used in a light producing unit and accordingly adjusts a first light attenuation device which is effective to attenuate the light directed toward an associated light sensing apparatus from a scene being photographed. A reference indicium is thereby established in accordance with the selected power level and with respect to a second selection device. The second selection device features two scales in a fixed relationship with respect to each other. The first scale includes indicia representative of various film speeds and the second scale includes indicia representative of the various *f* numbers of a camera lens apparatus. The second selection device is operable to align a selected film speed indicium with the reference indicium, thereby fixing the second selection device with respect to the reference indicium on the first selection device. A third selection device includes indicia representative of various camera-to-scene ranges and a corresponding pointer associated with each of the several indicia. The third selection device is operable to designate a selected range and accordingly to adjust a second light attenuation device which affects the light directed toward the light sensing apparatus from the scene being photographed. The pointer associated with the selected camera-to-scene range, points to a recommended *f* number on the second scale of the second selection device. A coupling automatically adjusts the camera lens apparatus in accordance with that recommended *f* number.

3,730,065
DEVICE FOR USE WITH SELF-DEVELOPING FILM
Israel Nesson, Fairlawn; Robert G. Palmer, Wayne; Edwin E. Faris, Wyckoff, and Charles J. Hertling, Bloomfield, all of N.J., assignors to Berkey Photo, Inc., Paramus, N.J.
Filed Feb. 28, 1972, Ser. No. 229,942
Int. Cl. G03b *17/52*
U.S. Cl. 95—13 **15 Claims**

A device is provided for use in a camera utilizing self-developing film. The film in question comprises a rupturable

pod of processing liquid which is sandwiched between a pair of photographic sheets. Attached to the exterior of one of the sheets and disposed adjacent the leading end thereof is an elongated removable feeder tab. The device is disposed within the camera and includes a pair of elongated spreader members which are biased towards one another to assume a substantially superposed relation and define an elongated predetermined minimum gap through which the photographic sheets and the pod, when in a collapsed state, are caused to move. As the film moves through the gap, the pod is ruptured and the processing liquid uniformly spread between the sheets. Compression means are disposed adjacent the infeed side of the gap and provide uninterrupted pressure on the opposite marginal segments of the film sheets. Compressive pressure is continuously exerted on the opposite marginal segments of the



film from a location substantially upstream of the spreader members into the gap between the spreader members and thereby confining the spread of the processing liquid to between the compressed marginal segments. Portions of the compression means extend into the gap and engage the film while the latter is moving therethrough. The device includes a guide means which is disposed adjacent the infeed side of the gap and directs the leading end of the film into the gap. The feeder tab carried by one of the photographic sheets is positioned over the guide member so as to circumvent the gap. The feeder tab projects outwardly from the camera housing and, as it is manually pulled therefrom, the feeder tab will cause the leading ends of the photographic sheets to pass through the gap and extend outwardly from the camera housing whereupon they may be grasped for manual pulling of the remainder of the film through the gap.

3,730,066

FILM MOVEMENT PREVENTION MEANS

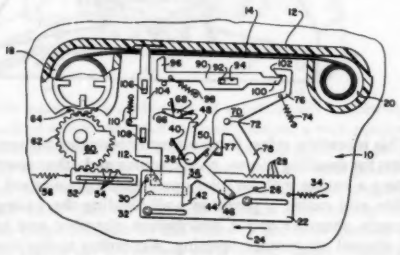
Helmut Ettischer; Wolfgang Ort; Horst Simon, and Kurt Steisslinger, all of 7 Stuttgart 60 Wangen, Germany, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed June 5, 1972, Ser. No. 259,828

Claims priority, application Germany, Oct. 14, 1971, G 71 38 818.6

Int. Cl. G03b *1/42*

U.S. Cl. 95—31 R **6 Claims**



A camera includes transport means operable for advancing received film which is perforated at predetermined metering intervals along an exposure plane, a metering mechanism operable to disable the transport means and a film sensing pawl movable into a film perforation to operate the metering mechanism and movable from the perforation after the transport means has been disabled. A film holding member is movable into a film perforation when the transport means has been disabled to prevent film movement along the exposure plane.

3,730,067

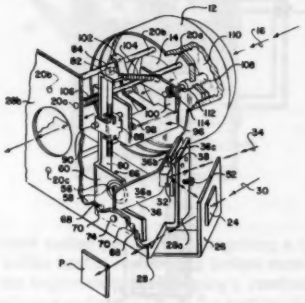
RANGEFINDER MECHANISM

Neil G. Seely, Brockport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 2, 1971, Ser. No. 168,222

Int. Cl. G03b *17/12*

U.S. Cl. 95—44 C **3 Claims**



A rangefinder of the type adapted to provide two superimposed images one of which is adjustable with respect to the other by focusing a lens system of a camera, for example, includes means for adjusting the rangefinder to correctly locate elements of the rangefinder so that two images of a scene are superimposed when the lens is focused on the scene. These adjustments include adjustment of a mirror about each of two axes substantially perpendicular to each other, and adjustment of a coupling between the lens system and the rangefinder mechanism so that the rate of adjustment of the rangefinder during focusing of the lens is coordinated with movement of the lens during such focusing of the lens system.

3,730,068

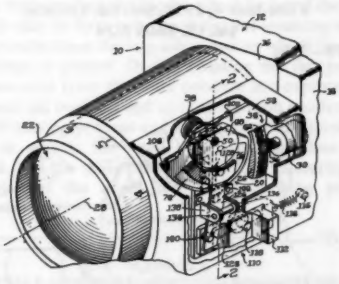
MOTOR DRIVEN CAMERA FOCUSING MECHANISM

Stanley R. Freeland, Glenview, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Sept. 13, 1971, Ser. No. 179,862

Int. Cl. G03b *3/00*

U.S. Cl. 95—44 R **15 Claims**



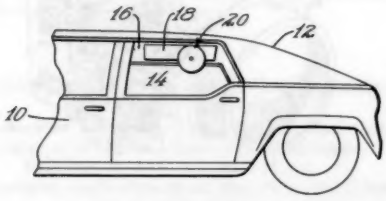
An electrically conductive pendulous member is mounted on a camera for operation in response to the principle of triangulation and for selective positive displacement into any operative condition by a manually actuatable control mechanism. Upon displacement of the pendulous member into engagement with a conductive portion of a carrier means, a motor of a lens focusing mechanism is energized to cause

simultaneous adjustment of the lens and the carrier means until the lens is in an "in-focus" condition. A secondary indicator circuit informs the user when a focusing operating is complete.

3,730,069
SINGLE EXPOSED PLASTIC RELIEF IMAGE PRINTING PLATE WASHER
Richard D. Bunker, Salt Lake City, Utah, assignor to Dyna-Flex Corporation, Salt Lake City, Utah
Filed Jan. 3, 1972, Ser. No. 214,575
Int. Cl. G03d *3/02*
U.S. Cl. 95—98 **3 Claims**

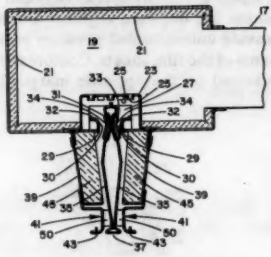
An apparatus for washing away the water soluble areas of a plastic emulsion covering a plate used in printing operations. Portions of the normally water soluble plastic emulsion become insoluble in water when exposed to actinic or ultraviolet light through a light dark master. The apparatus of the invention consists of a housing wherein water is sprayed uniformly over a printing plate by an arrangement of nozzles to remove the portions of the plastic emulsion remaining water soluble. The nozzles reciprocate to uniformly spray all areas of the emulsion coating, developing thereon, in plastic relief, a representation of the light dark master. The reciprocating nozzles also cyclically apply heated air to the developed plate. The printing plate is releasably maintained within the apparatus housing by adjustable spring clamps which secure the corners of the printing plate to a wash surface on a door of the housing.

3,730,070
REAR WINDOW DEFROSTER
Reuben L. Pedersen, 1303 5th Avenue, Stillwater, Minn.
Filed June 4, 1971, Ser. No. 150,086
Int. Cl. B60h *1/24*
U.S. Cl. 98—2.04 **1 Claim**



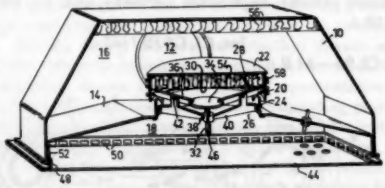
A wind driven rear window defroster adapted to be mounted in the side window space of a vehicle so as to circulate and direct warm air from the interior of the car onto the rear window for defrosting purposes, the circulating fan being driven by a wind driven fan outside the vehicle.

3,730,071
AIR CONDITIONING TERMINAL
August W. Gutheim, Chittenango, and Carl C. Herb, Camillus, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.
Filed June 25, 1971, Ser. No. 156,649
Int. Cl. F24f *13/06*
U.S. Cl. 98—40 D **1 Claim**



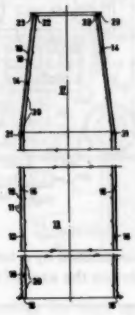
An air conditioning terminal for use in an air conditioning system for discharging conditioned air into a space which includes a diffuser spaced from opposed parallel walls; the opposed parallel walls and diffuser cooperate to define therebetween two discharge air streams. Spacers are provided between opposed surfaces of the diffuser and the parallel walls. The sides of the spacers are in intimate contact with the opposed surfaces of the diffuser and parallel walls. The spacer acts to maintain a predetermined distance between the diffuser surfac.. and the opposed terminal wall.

3,730,072
AIR OUTFLOW DEVICE
Lars Soderlund, and Ake Moller, both of Tomelilla, Sweden, assignors to Ar-Ventilation AB, Stockholm, Sweden
Filed June 1, 1971, Ser. No. 148,519
Claims priority, application Sweden, June 24, 1970, 8741/70
Int. Cl. F24f *13/06*
U.S. Cl. 98—40 D **5 Claims**



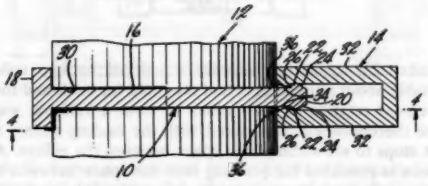
This invention refers to an air outflow device for ventilation plants for dwelling rooms, public rooms and other rooms comprising a casing with an inlet opening for pressurized air and within said casing a partition wall dividing the casing into a pressure chamber and a distribution chamber and having a slot shaped air passage opening. According to the invention, the air passage opening is formed as an air gap between an upwardly directed, tubular socket and a cap above said opening having a peripheral wall portion reaching downwards around the socket, the gap being adjustable by displacement of the cap towards and away from the partition wall for adjusting the width of the air passage opening between the socket and the cap to uniform values around its periphery so as to obtain a uniform and symmetric distribution of the air to the air distributing chamber and from this to the room.

3,730,073
CHIMNEYS
Patrick Potter, 25 Queenwood Avenue, Hamilton, New Zealand
Filed Aug. 4, 1971, Ser. No. 168,885
Int. Cl. E04h 12/28
U.S. Cl. 98—60 11 Claims



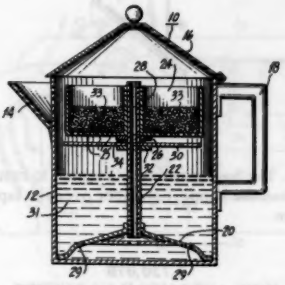
A chimney comprising a corrugated outer shell, an inner shell incorporating a section having corrugations at desired spacings so as to compensate for any unequal expansion between the outer shell and the inner shell, and fiber-glass or other suitable heat insulation medium packed into the space between such shells, of which the following is a specification.

3,730,074
GRILLE
Frederick Charles Helwig, Union, N.J., assignor to Construction Specialties, Inc., Cranford, N.J.
Filed Feb. 16, 1971, Ser. No. 115,279
Int. Cl. A23c 15/02
U.S. Cl. 98—121 5 Claims



A grille comprising a plurality of substantially spaced-apart bars, each of which includes in cross-section, a web portion, a flange at one end of the web portion that has parts that project laterally, relative to the web portion, and an enlargement at the other end of the web portion that forms beads projecting out from each face of the web portion and having faces generally perpendicular to the faces of the web portion and generally facing the projecting parts of the flange. A plurality of blades extend substantially crosswise of the bars, and the blades and bars are mutually slotted and are interfitted in egg-crate fashion. Each bar receives a blade retainer that is generally U-shaped in cross-section, has resiliently deformable legs, and is provided with a bead extending inwardly from each leg that is captured by the beads on the bars. One edge of each blade engages the outwardly projecting parts of the bar flanges, and the other edges of the blades are engaged by the ends of the legs of the blade retainers.

3,730,075
PERCOLATOR
Bruce Paul Strauss, 624 62nd St., and Michael Andrew Otavka, 8016 Highland Avenue, both of Downers Grove, Ill.
Filed Feb. 19, 1971, Ser. No. 116,919
Int. Cl. A47j 31/00
U.S. Cl. 99—310 2 Claims



An improved coffee percolator comprising a container, a perforated coffee basket seated on a hollow stem within said container, the improvement comprising a condensation plate on said stem below and spaced from the bottom of said basket.

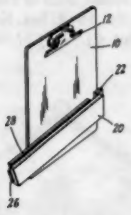
3,730,076
ROASTING BAG
Myron M. Levin, Highland Park, Ill., assignor to E-Z Por Corporation, Niles, Ill.
Filed July 21, 1971, Ser. No. 164,780
Int. Cl. A47j 37/10, 37/01
U.S. Cl. 99—347 13 Claims

A bag for use in roasting and cooking food products, such as meat, fowl, fish and the like, which bag is formed of an inner layer of paper material and an outer layer of aluminum foil bonded to the paper material, with the side of the bag which forms the bottom when the food product is placed therein provided with slits to form vent openings for draining of the fat and condensate from the bag into a pan in which the bag and food product is placed. During roasting the fat, juices and basting material from the food product are captured within the bag and fall back on and against the food product to provide a self-basting process and the flavor of the cooked food product is greatly increased. The cooking time can be decreased, and the mess caused by normal spattering against the interior of the oven during the cooking process is eliminated.

3,730,077
COLLAPSIBLE LAPBOARD STRUCTURE
Boynton Selden, 81 Uplands Drive, West Hartford, Conn.
Filed May 12, 1972, Ser. No. 252,620
Int. Cl. A47b 17/00
U.S. Cl. 108—43 8 Claims

A collapsible lapboard structure has a base, a spacer member hingedly joined thereto, and a support member in turn hingedly joined to the spacer member. When the structure is in its erected position the base member and support member extend perpendicularly from one side of the spacer

member, and the hinges employed cooperate therewith to maintain that relationship against downward force on the support member. The base member is adapted to rest upon a seat so as to position the support member over the lap of a person seated thereon.

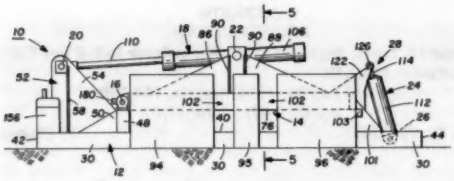


3,730,078

JUNK AUTOMOBILE CRUSHER

Robert L. Flanagan, Dallas, Tex., assignor to Mobil Auto Crushers Corporation of America, Oklahoma City, Okla.

Filed May 14, 1971, Ser. No. 143,352
Int. Cl. B30b *15/16*
U.S. Cl. 100—48 **22 Claims**



An automobile crusher is disclosed which produces a package of predetermined height with parallel upper and lower faces and a limited length and width to facilitate stacking for shipping and handling. The crusher includes a base forming a bin having an open top for receiving the automobiles, and a lid pivotally connected to the upper edge of one wall of the bin. A hydraulic actuator having a cylinder pivotally connected to the lid and a rod pivotally connected to the base raises and lowers the lid with the weight of the cylinder and fluid therein assisting materially in crushing autos in the bin as the bin is lowered. A second cylinder can be latched to the free end of the lid to assist in pulling the lid down to crush the autos. The crusher has a fully automatic cycle remotely controlled by a radio located on the vehicle being used to load the crusher, thus requiring only one operator for the total operation. In one embodiment, the auto crusher is a self-propelled unit having a single integral chassis having a size and weight such as to legally travel on substantially all highways in the United States.

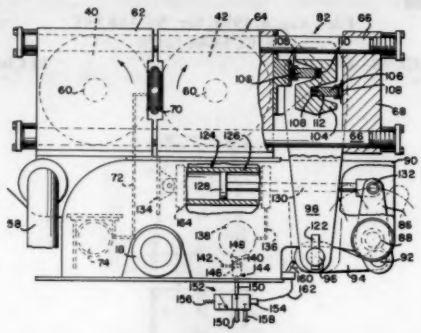
3,730,079

VARIABLE NIP PRESS HAVING ROLLS MAINTAINED ON PARALLEL AXES

Sidney E. Stirk; John P. Rich, both of Nashua, and Russell E. Holt, Candia, all of N.H., assignors to Improved Machinery Inc., Nashua, N.H.

Filed June 22, 1971, Ser. No. 155,441
Int. Cl. B30b *9/20, 3/04*
U.S. Cl. 100—121 **20 Claims**

A press comprising a plurality of press rolls rotatable about parallel axes, wherein one of the press rolls is laterally movable relative to the other to vary the cross-section of the therebetween nip. Pressing force is applied to the laterally movable press roll by a plurality of separate link systems actuated by individual fluid pressure operated actuators; and the link systems are interconnected by a torsion bar which causes the link systems to maintain the axes of the press rolls parallel.

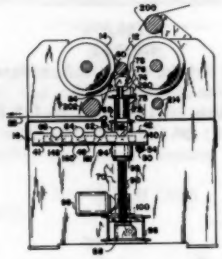


3,730,080

EMBOSSER USING SMALL DIAMETER EMBOSSING ROLLS

John Deligt, Covington, Va., assignor to Westvaco Corporation, New York, N.Y.

Filed Aug. 5, 1970, Ser. No. 61,135
Int. Cl. B41f *11/00, 13/44*
U.S. Cl. 101—23 **15 Claims**



Embossing apparatus includes a pair of backup rollers rotatable about parallel axes and mounted for back-and-forth movement relative to each other to form a variable width space therebetween. Associated with the backup rollers are back stops to set width of the space between the rollers. Apparatus is provided for pressing into the space between the backup rollers an unsecured, freely positionable embossing roller having a diameter larger than the width of the space. An embossing nip is formed between the embossing roller and at least one of the backup rollers.

3,730,081

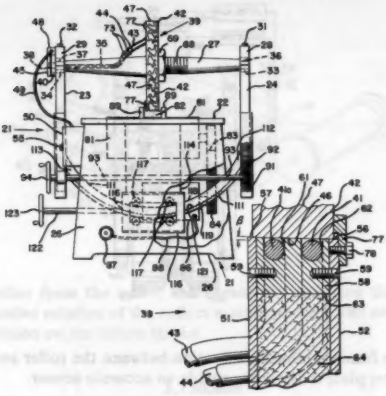
ROTORY HOT DIE EMBOSSER WITH TAPERED SHAFT AND INSULATED EMBOSSING WHEEL

Gary C. Colledge, 13900 Marguesas Way, Marina Del Rey, Calif.

Filed Jan. 7, 1972, Ser. No. 216,061
Int. Cl. B44b *5/00*
U.S. Cl. 101—25 **10 Claims**

A high speed, high temperature embossing machine for embossing wood products and a high temperature embossing wheel therefor is disclosed. The embossing wheel is electrically heated by elements carried at the rim thereof to temperatures as high as 1,400°F., and an embossing feed rate as high as 200 feet per minute may be employed. A large diameter hol-

low wheel filled with a thermally insulating material and a tapered, elongated shaft are employed to minimize heat



transfer to the shaft bearings for high speed operation. Embossing wheel tilting and embossing wheel raising and lowering mechanisms are also disclosed.

3,730,082

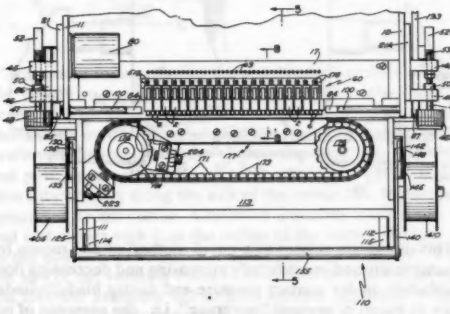
IMPACT LINE PRINTER

Richard Anthony Perry, Attleboro, Mass., assignor to Odec Computer Systems, Inc., East Providence, R.I.

Filed Aug. 24, 1971, Ser. No. 174,315

Int. Cl. B41j *1/30*

U.S. Cl. 101—93 C **10 Claims**



This disclosure relates to an impact hammer printer and the structure for adjusting the platen face of each individual hammer, individually and collectively in relation to a stationary anvil and type faces rotatively mounted in a closed loop past the platen faces of an upper and lower bank of hammers. The disclosure also includes a pivotal yoke arrangement forming part of the machine frame which carries the closed loop guide track, anvil and character carrying closed loop.

3,730,083

PRINTING MECHANISM

Curt Hjerpe, Molndal, Sweden, assignor to Facit AB, Atvidaberg, Sweden

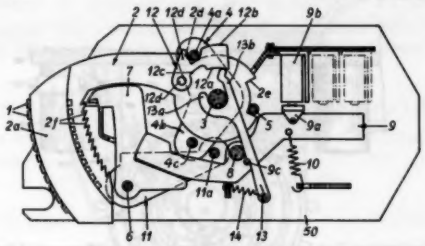
Filed Dec. 16, 1970, Ser. No. 98,598

Claims priority, application Sweden, Dec. 18, 1969, 17478/69

Int. Cl. B41f *5/06*

U.S. Cl. 101—93 MN **9 Claims**

The present invention relates to a printing mechanism for simultaneous order printing (i.e. synchronous printing in all denominations) for calculating machines or the like or for use as output devices at data terminals or the like and provides means for maintaining a positive engagement between a drive transmitting member and setting means for type carriers by the action of a control member which will be moved out of an active position when the selected type carriers have been



brought into their printing position. A substantial advantage is attained through this arrangement in comparison with known structures for similar use in which excessive efforts may be necessary to overcome compound spring action. A further advantage is that any time lag caused by the inertia of spring-actuated parts will not occur in transmitting the drive to the type carriers.

3,730,084

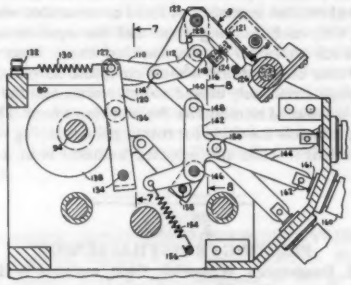
SELECTIVELY ACTUABLE MEANS FOR PRINTING HEADS

Herbert Tramposch, Riverside, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Feb. 24, 1971, Ser. No. 117,920

Int. Cl. B41j *3/00, 1/04*

U.S. Cl. 101—109 **4 Claims**



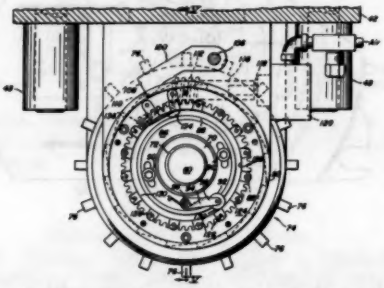
A printing apparatus is provided including a plurality of heads positioned in linear alignment at a printing station for printing along one dimension of a rectangular array of rows and columns on a surface such as a card. Each head includes a wettable medium for transferring printing solution from a reservoir to the card. A transportable reservoir is provided containing a volatile solution of printing material and having an equal plurality of apertures for receiving the printing heads in sealing engagement. Means are provided for disengaging the reservoir and printing head, for selecting one or more of the printing heads for printing, and for forcing the head into contact with a card which has been advanced to a printing station of the apparatus.

3,730,085

SELECTIVE DRUM PRINTER WITH PAWL MEANS TO LOCK THE TYPE WHEEL IN SELECTED POSITION

Norman A. Beck, Ellicott City, Md., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Division of Ser. No. 6,201, Jan. 27, 1970, Pat. No. 3,633,498.
This application Sept. 20, 1971, Ser. No. 181,747
Int. Cl. B41j *7/48*
U.S. Cl. 101—110 **4 Claims**



Apparatus for marking a plate member at a preselected location and to impress selected characters on opposite sides of the mark. A bridge member spans a layout table and is movably supported on a pair of rails secured to the table sides so that the bridge member is movable longitudinally along the layout table. A turret assembly is movably supported on the bridge member and is movable longitudinally thereon and transversely relative to the layout table. The turret assembly includes a marking head assembly that is movable vertically toward and away from the plate positioned on the layout table. The marking head assembly includes a central support member with a punch member extending downwardly therefrom and a pair of marking wheels rotatably supported on opposite sides of said support member. The marking wheels have a plurality of raised characters positioned at spaced intervals along the outer periphery. The marking wheels are rotated by means of a driven worm gear assembly and a pawl ratchet assembly. A fixed commutator wheel is associated with each marking wheel and has separate commutators for each character on the marking wheel. Separate fixed and movable commutator wheels complete an electrical circuit through a remotely closed switch circuit and the commutator for a selected numeral on the marking wheel. The circuit remotely controls the drive for rotating the marking wheel and stops the wheel when the selected numeral is in a marking position.

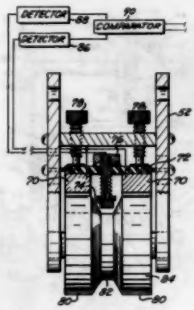
3,730,086

PRINTING PRESS FILM SENSOR

Walter E. Dauterman, Willowick, Ohio, assignor to Harris-Intertype Corporation, Cleveland, Ohio

Filed June 10, 1970, Ser. No. 45,119
Int. Cl. B41l *25/00*; H01g *5/20*; G01r *27/26*
U.S. Cl. 101—148 **2 Claims**

An improved sensor has been provided for measuring the thickness of the film of dampening fluid on one of the rolls in the dampening mechanism of a lithographic printing press. The sensor comprises a capacitor formed between a sensor roller which runs in contact with the dampener form roll and a capacitor plate disposed concentric with the roller. The sensor roller which runs in contact with the dampener form roll has a film of dampening fluid thereon the thickness of which is dependent upon the thickness of the film of fluid on the dampener form roll. The sensor senses the change in capacitance of the capacitor which results primarily from the change in the dielectric of the space between the capacitor plate and the roller. The changes in the dielectric result from changes in the thickness of the film of dampening fluid on the roller. A frame is provided to support the capacitor plate and the sensor roller



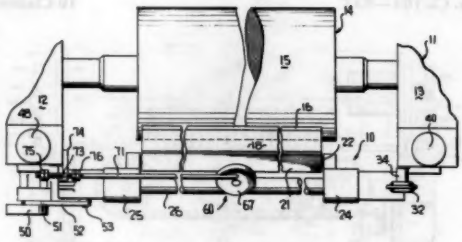
and the frame minimizes vibration between the roller and the capacitor plate to thereby provide an accurate sensor.

3,730,087

DOCTOR BLADE PRESSURE/ANGLE ADJUSTING MECHANISM

Robert F. Trant, Chicago; Kenneth W. Gray, Justice, and John W. Capron, Palos Heights, all of Ill., assignors to Continental Can Company, Inc., New York, N.Y.

Filed Feb. 1, 1971, Ser. No. 111,201
Int. Cl. B41f *9/10*
U.S. Cl. 101—169 **6 Claims**



This disclosure relates to a novel method of and means for automatically and repetitiously increasing and decreasing doctor blade/cylinder contact pressure and doctor blade/cylinder angle to lessen or prevent "coverage", i.e., the presence of ink haze in the nonimage area of a print.

3,730,088

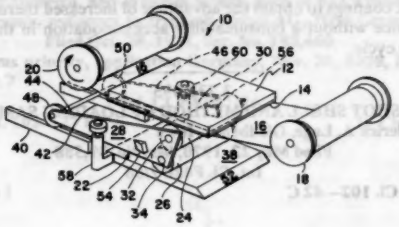
EXTREME PRESSURE PLATEN-AND-ROLLER DIE-PRESS FOR PRECISE WORKING OF WEB STRUCTURES

Remsen V. Wood, Riderwood, Md.

Filed May 28, 1971, Ser. No. 148,028
Int. Cl. B41f *3/16, 3/22*
U.S. Cl. 101—269 **11 Claims**

A die-press for precise high pressure deformation of web structures, including in typical embodiment a downward facing die platen having a die integral with the face, a guide platen fixed in plane-parallel spacing below the die platen; twin horizontal rollers of combined diameters greater than the plane-parallel spacing, and stacked in contact in parallel nearly over-and-under relation in the space between the platens; a reciprocable carriage rotatively mounting the ends of the rollers and having an extension adapted to travel along a guide during the working stroke to define the angle of the over and under relation of the rollers and thus the roller pressure, and apparatus to position a web between the upper roller and

the die; a recess at the end of the guide platen relieves pressure as the working stroke is being completed and separates



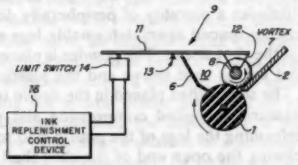
the roller from the work, and means for changing the over-and-under relation of the rollers maintains the roller and work separation on the return stroke.

3,730,089

INK MONITORING APPARATUS

James B. McCutcheon, Canandaigua, N.Y., assignor to Itek Corporation, Lexington, Mass.

Filed June 16, 1971, Ser. No. 153,722
Int. Cl. B41f *31/06*
U.S. Cl. 101—363 **9 Claims**



Apparatus for monitoring the supply of ink contained within the supply reservoir of a printing press. The ink within the reservoir is monitored by first forming it into a vortex and then monitoring a radial dimension of the vortex. According to the preferred embodiment, the monitoring structure includes a rod positioned within the reservoir which will assume a position substantially along the axis of the vortex due to the forces generated by the vortex. A follower assembly is carried by the rod and moves with it as the radius of the vortex changes due to the addition or withdrawal of ink from the reservoir. When the size of the vortex is reduced to a predetermined minimum, the follower assembly will actuate suitable apparatus to automatically add additional ink to the reservoir.

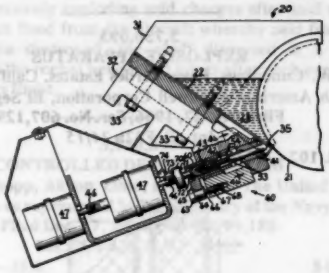
3,730,090

ADJUSTING ARRANGEMENT FOR INK FOUNTAIN BLADE

Gary R. Lamberg, and Louis S. Depa, both of Chicago, Ill., assignors to North American Rockwell Corporation, Pittsburgh, Pa.

Filed Feb. 16, 1971, Ser. No. 115,287
Int. Cl. B41f *31/02*
U.S. Cl. 101—365 **5 Claims**

An arrangement for adjusting the blade of an ink fountain in a printing press to control the thickness of the ink film fed to the ink rollers. A plurality of plungers are provided along the length of the fountain blade at regularly spaced positions. The plungers are threaded in respective cartridges with individual drive motors to vary the position of the plunger in the cartridge. The cartridges are mounted for bodily axial movement in the ink fountain frame, with a manually operated adjusting screw interposed between the cartridges and the frame for adjustment of position. Thus when the plunger occupies an extended limit position, the reference screw may be adjusted to move the blade into a closely spaced reference position with respect to the fountain roller, with the width of the gap of the fountain roller being thereafter controllable by retracting the plunger in the cartridge by energizing the motor. In the preferred embodiment a threaded adjusting sleeve is interposed between the plunger and the cartridge and connected to the drive shaft thereby providing inner and outer threaded connections which are differentially related to produce precise gradual movement of the plunger in response to motor rotation.

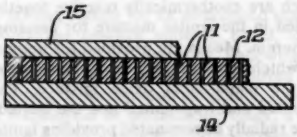


3,730,091

IMAGE TRANSFER LAYERS FOR INFRARED TRANSFER

Joseph Gaynor, Arcadia, Calif., assignor to Bell & Howell Company, Chicago, Ill.

Filed Oct. 23, 1970, Ser. No. 83,397
Int. Cl. B41m *5/02*; G01n *21/34*
U.S. Cl. 101—471 **11 Claims**



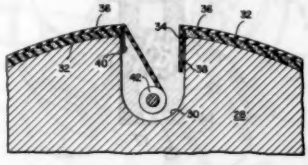
An improved image resolution in thermo-transfer duplicating processes is accomplished by means of dispersing a plurality of thermally conductive particles in the dye-wax layer of transfer material used in such processes and applying an electrical or magnetic field to the transfer material layer sufficient to orient and align the particles parallel to the direction of the field. In this way the improved dye-wax layer of transfer material is capable of greater thermal conductivity in the direction transverse to the layer than in the lateral direction of the layer.

3,730,092

MAGNETIC SHEET FOR IMPRESSION CYLINDER

John E. Pickard, Ellicott City, and Charles H. Weber, III, Silver Spring, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Filed March 5, 1971, Ser. No. 121,332
Int. Cl. B41f *29/04*
U.S. Cl. 101—415.1 **6 Claims**



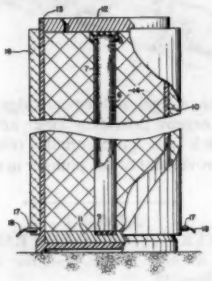
The invention disclosed is directed to a laminated magnetic sheet which avoids known bolster problems and which pro-

vides an equalized effective printing pressure between a printing surface and a web of paper being printed. The magnetic press sheet is formed of a flexible magnetic material, is disposed over the substrate without bolster, and includes L-shaped edge members for retaining in position against the surface of an impression cylinder by contact with a depression in the substrate.

3,730,093
EXPLOSIVE APPARATUS

Jerry W. Cummings, Palos Verdes Estates, Calif., assignor to North American Rockwell Corporation, El Segundo, Calif.

Filed Dec. 27, 1966, Ser. No. 607,129
Int. Cl. F42b *24/15*
U.S. Cl. 102—6 2 Claims

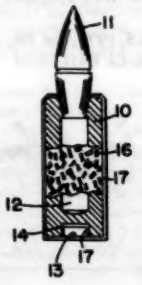


In one embodiment a cylindrical mass of fuel is surrounded on the sides by a layer of high explosive for implosive dissemination of the fuel. Axially within the fuel is a frangible tube containing a powdered igniter mixture of metal and metal oxide which are exothermically reactive together. Gas voids are provided in the igniter mixture for assuring initiation of reaction therein. Means are provided for detonating the high explosive which sends an implosive shock wave through the fuel and the metal-metal oxide mixture. The mixture is thereby ignited and fragmented and the heated mixture and the fuel are radially disseminated providing ignition of the fuel as it is disseminated. The nature of the arrangement permits use for fuel of a broad variety of materials including materials known to be combustible and also a variety of materials not normally considered combustible.

3,730,094
ENERGETIC PROTECTIVE COATING FOR CASELESS AMMUNITION

Joseph B. Quinlan, Philadelphia, Pa., assignor to The United States of America as represented by the Secretary of the Army

Filed June 12, 1970, Ser. No. 45,743
Int. Cl. F42b *5/18*
U.S. Cl. 102—38 3 Claims

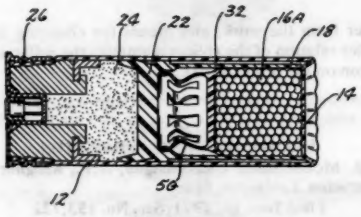


Caseless ammunition comprising propellant components provided with an energetic thermal and moisture-resistant coating are characterized by good environmental protection. The employment of a high temperature resistant explosive as a component of the coating permits the application of relatively thick coatings to obtain the advantage of increased thermal resistance without a consumability accommodation in the ballistic cycle.

3,730,095
SHOT SHELL AND METHOD OF LOADING SAME

Frederick A. Lage, Gladbrook, Iowa

Filed May 22, 1970, Ser. No. 39,588
Int. Cl. F42b *7/08*
U.S. Cl. 102—42 C 1 Claim

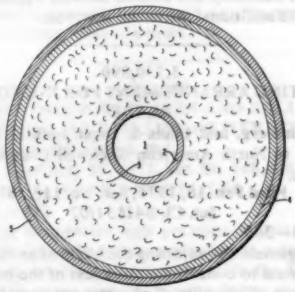


A shot shell casing includes a quantity of powder at one end and a shot sleeve is disposed in the casing on the powder and is open at one end. A plastic shot wad is positioned in the shot sleeve and includes a plurality of peripherally disposed rearwardly extending spaced apart deformable legs engaging the closed end of the shot sleeve. The powder is placed in the shot shell followed by the shot sleeve and the plastic wad in the shot sleeve. The shot is then placed in the sleeve on the plastic wad and pressure is applied compressing and permanently uniformly deforming the legs of the plastic wad to a sufficient length for closing the open end of the shot shell casing onto the shot. The legs of the shot wad are uniformly bent transversely inwardly in a plane intermediate their ends. A ring element interconnects the free ends of the legs.

3,730,096
DETONATING FUSE

Josef Prior, Troisdorf, Germany, assignor to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Filed Dec. 1, 1970, Ser. No. 94,086
Int. Cl. F42b *3/10*
U.S. Cl. 102—27 R 16 Claims



Detonating fuse having a core of high explosive and being enclosed by a casing or sheath, wherein at least one hollow space is arranged within the explosive core. The hollow space extends over the entire length and is provided with a lining surrounding this hollow space with respect to the explosive surrounding the same on all sides.

3,730,097
FUZE FOR USE IN FIREDAMP-ENDANGERED AND COAL-DUST-ENDANGERED OPERATIONS

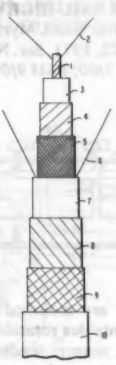
Werner Helfgeni, and Wilhelm Rohde, both of 521 Troisdorf, Germany, assignors to Dynamit Nobel AG, West Germany

Filed Oct. 28, 1971, Ser. No. 193,460

Claims priority, application Germany, Nov. 20, 1970, P 20 57 042.7

Int. Cl. F42b *5/04*

U.S. Cl. 102—27 R **17 Claims**



A fuze for use in firedamp and coal-dust endangered operations suitable for use in the longhole blasting technique which includes a hollow tube, an explosive core of desensitized explosive surrounding the hollow tube, a wound strip of plastic encasing the explosive core, a multiple-layer spun casing of fibers enclosing the wound plastic strip and an envelope of inert substances surrounding the multiple-layer spun casing. The envelope is, preferably, a mixture of a polymer and insert substances covered, respectively, by cellulose-base fibers, a wound strip of plastic, a multiple-layer spun envelope of fibers, and finally a waterproof outer shell of synthetic resin.

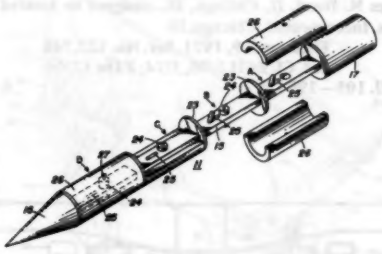
3,730,098
APPARATUS FOR QUICK-BLOSSOMING CHAFF EJECTION

William R. Edwards, California, Md., assignor to The United States of America as represented by the Secretary of the Navy

Filed Jan. 16, 1959, Ser. No. 787,310

Int. Cl. F42b *15/24*

U.S. Cl. 102—34.4 **10 Claims**



1. A chaff dispersion apparatus having a substantially cylindrical rocket dispensing head adapted to be fired from an aircraft, the improvement in said dispensing head comprising a main body portion, a nose cone mounted on the forward end of said main body portion and variable firing means mounted at the rearward end thereof, a plurality of sections in said rocket head located intermediate said nose cone and said firing means, a plurality of equally spaced partitions mounted perpendicularly on said main body portion forming said sections, a frangible container enclosing each section, chaff stacked in orderly rows within said containers, an explosive charge within each container mounted on the axis of said main body portion to insure that the forces of the explosive are applied to the chaff in a radial direction and said variable firing means progressively exploding said charges after said rocket head has been fired from the aircraft whereby said frangible containers are destroyed, the chaff dispersed in a radial direction and the rocket head is left intact after each explosion to continue its flight.

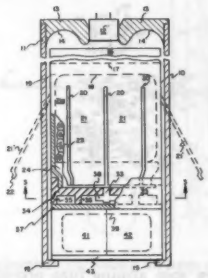
3,730,099
CONTROLLED DESCENT SYSTEM

Lloyd W. Schopp, Akron, Ohio, assignor to The United States of America as represented by the Secretary of the Navy

Filed Dec. 17, 1970, Ser. No. 99,185

Int. Cl. F42b *15/12, 25/02*

U.S. Cl. 102—35.6 **5 Claims**



A descent retarding system for an airdropped store is provided by a multistage canister allowing timed, sequential deployment of a parachute and parawing. Following ejection of the store, split half rings and a cover are removed from one end for deployment of a deceleration parachute. After a delay provided by a mechanical or pyrotechnic timer, a retaining member is removed from a parawing compartment allowing resilient, longitudinal finger-like sections of the compartment housing to spring outwardly allowing rapid deployment of an accordion-folded parawing. The parachute is jettisoned once the parawing has inflated.

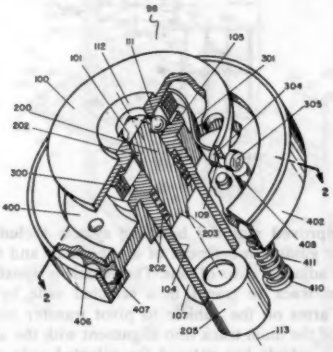
3,730,100
MECHANICAL ANTI-DISTURBANCE DEVICE

Harry J. Hadfield, Califon, N.J., assignor to The United States of America as represented by the Secretary of the Army

Filed July 12, 1971, Ser. No. 161,585

Int. Cl. F42c *7/02*

U.S. Cl. 102—70 S **1 Claim**



This invention relates to a mechanical anti-disturbance device for preventing the movement of a munition after it has

been emplaced. The device uses a movable pendulous mass as a triggering means for releasing a restraining means which is fixedly holding a spring biased firing pin to a housing means when the device is in an armed state.

3,730,101

LOW SPIN ARMING FUZE FOR AUTOROTATING MUNITIONS

Edward G. Schultz, Jr., Richmond, Ind., assignor to Arco Corporation, Richmond, Ind.

Filed Aug. 18, 1971, Ser. No. 172,695
Int. Cl. F42c *15/22*
U.S. Cl. 102—79 11 Claims

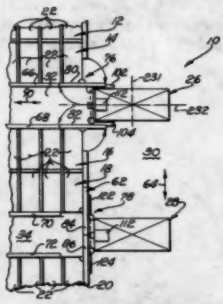
An improved low spin arming fuze providing a safer and more reliable fuze for autorotating munitions is disclosed. The spin fuze provides for the arming of the fuze during initial spin-up due to the centrifugal force provided by the rotational velocity when the munition is deployed and permits initiation of the fuze upon spin decay, as occurring at impact. The fuze may ignite either the detonator or multiple pop-up charges combined with a delayed detonation of the munition.

3,730,102

MATERIAL HANDLING SYSTEM

George R. Pipes, South Euclid, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Filed Feb. 22, 1971, Ser. No. 117,321
Int. Cl. B60s *13/02*
U.S. Cl. 104—48 9 Claims



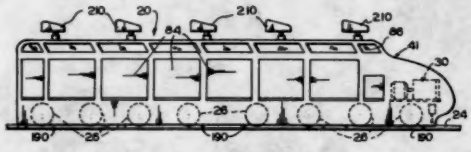
An improved material handling system includes a main track for guiding movement of a vehicle to and from aisles between adjacent rows of bins. The vehicle is transferred from the main track to tracks in a selected aisle by operating transfer arms on the vehicle to pivot transfer rails forming lengths of the main track into alignment with the aisle tracks. Once the vehicle has entered the selected aisle and moved beyond the transfer rails, biasing springs pivot the transfer rails back into alignment with the main track where the transfer rails are held in place by latch assemblies. When the vehicle starts to leave the selected aisle and is approaching the main track, the vehicle operates trip linkages to release the latch assemblies. Continued movement of the vehicle toward the main aisle operates other linkages to pivot the transfer rails back into alignment with the aisle tracks against the influence of the biasing springs.

3,730,103

CONVERTIBLE RAIL-HIGHWAY VEHICLE

George D. Weaver, Weaver Road, Myrtle Creek, Oreg.

Filed June 22, 1971, Ser. No. 155,451
Int. Cl. B61d *15/00*; B61f *9/00*; B62d *61/12*
U.S. Cl. 105—141 13 Claims



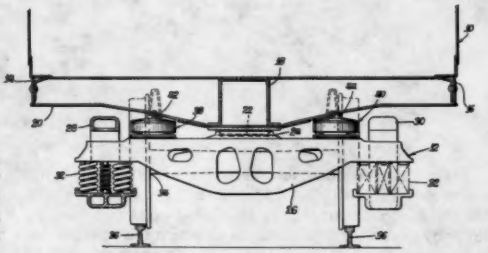
Grooved rail wheels are mounted on retractable frames slidable on posts of turntables rotatable by steering cylinders controlled by magnetic sensors tending to be centered on a rail. The turntables are mounted on carriages supporting a car frame and movable laterally of the car frame. Cylinders connected together in a closed circuit cause some of the carriages to be moved toward one side of the car frame when others of the carriages are moved toward the other side of the car frame, thus centering the car frame on the group of carriages. Outrigger pneumatic wheels may be retracted when the rail wheels are extended and may be extended when it is desired to travel away from the rail. The pneumatic wheels are mounted on retractable frames, carried by turntables which are steered in pairs by racks engaging pinions on the turntables, the racks being movable by pivotal longitudinal members pivoted near the center of the car to turn the wheels nearer the center of the car less than the wheels near the ends of the car in rotating the car. Actuating wires movable with the racks causes compensating movement of the pivots of the longitudinal members to lessen this differential turning of the wheels. Ice blocks carried by the cylinders may be urged into engagement with the ground or rails to provide stabilizing. A pendulum on the car acts to shift wind vanes on the top of the car to correct tilt to one side or the other.

3,730,104

FLUID DAMPENING SIDE BEARINGS

Charles N. Hood, II, Chicago, Ill., assignor to Amsted Industries, Incorporated, Chicago, Ill.

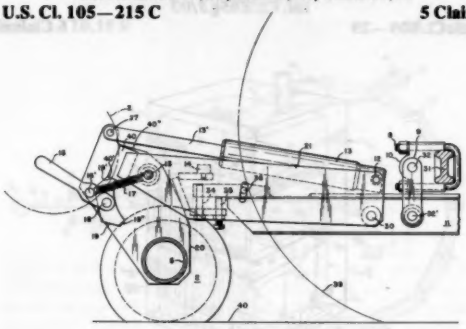
Filed April 9, 1971, Ser. No. 132,748
Int. Cl. B61f *5/06*, *5/14*; F16c *17/04*
U.S. Cl. 105—199 CB 6 Claims



The fluid side bearing, mounted on each side of the bolster of the truck, includes a pair of concentric elastomer rings sur-

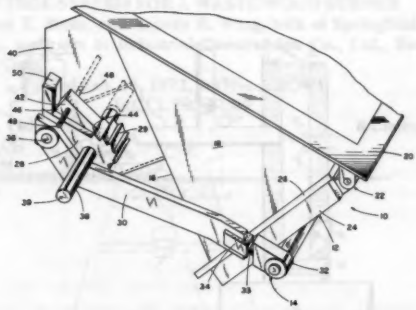
rounding a pair of interior hydraulic chambers connected by a regulating valve. The concentric rings coact with one another in stages and with the hydraulic system to dampen rocking motions of the car body relative to the truck bolster.

3,730,105
CONVERTIBLE RAILHIGHWAY VEHICLE
John D. Holley, Montgomery, Ala., assignor to Holley Engineering Co., Inc., Montgomery, Ala.
Filed Oct. 29, 1971, Ser. No. 193,654
Int. Cl. B61d *15/00*; B61f *9/00*; B62d *61/12*
U.S. Cl. 105—215 C **5 Claims**



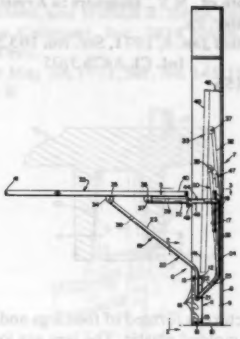
A rail travel attachment for road vehicles having pneumatic tires includes a rail guide wheel adjacent each vehicle wheel for engagement with the rails of a railway. Longitudinal beams connected to the axles of the vehicle support front and rear rail guide wheels on each side of the vehicle. Hydraulically actuated jacks rotate each rail guide wheel into and out of engagement with the rails to guide the vehicle on the rails, rear pneumatic wheels of the vehicle resting on and engaging the rail. A manually actuated locking pawl associated with each of the hydraulically actuated jacks securely locks each rail guide wheel in either its rail engaging position or in its upper out-of-rail engaging position.

3,730,106
DOOR OPENING MECHANISM
Robert S. Tamborski, Griffith, Ind., assignor to Pullman Incorporated, Chicago, Ill.
Filed May 18, 1971, Ser. No. 144,479
Int. Cl. B61d *7/18*
U.S. Cl. 105—253 **4 Claims**



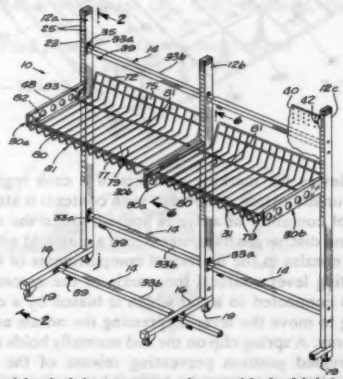
A hopper discharge arrangement for emptying the contents of a hopper and including a pivoted door disposed beneath the hopper and connected to a crank and link type of linkage mechanism. The crank member has an integrally formed ratchet gear disposed on one end and a locking bar positioned adjacent the crank member to maintain the doors closed and allow gradual stepped closing of the doors by engagement of the locking bar with a tooth of the ratchet gear. The locking bar adjacent the crank member includes a cam portion engageable with the crank to move same into the overcenter unlocked position upon unlocking rotation of the locking bar.

3,730,107
FOLDING BRACKET MECHANISM
Robert L. Bergkamp, and Helen Gerber Bergkamp, both of R.R. No. 2, Cheney, Kans.
Filed Oct. 19, 1971, Ser. No. 190,619
Int. Cl. A47b *3/00*
U.S. Cl. 108—39 **3 Claims**



A bracket mechanism including an upper brace and a lower brace for mounting a support member, such as an ironing board, desk, table, drawing board, or the like, in either a substantially horizontal operative position or a substantially upright inoperative position. The braces are mounted for swinging movement in a cabinet in which the bracket mechanism and support member are stored, in the folded positions of said parts. The cabinet also provides in part a support for the swingably mounted braces. A latch means retains the support member and braces in the operative positions of said parts and is manually releasable to enable said parts to swing to folded storage positions.

3,730,108
ADJUSTABLE SHELVING STRUCTURE
Alvin L. Stroh, 9409 South Downey Avenue, Downey, Calif.
Filed April 26, 1971, Ser. No. 137,524
Int. Cl. A47b *9/00*
U.S. Cl. 108—108 **7 Claims**



An adjustable shelving structure is provided which includes horizontally extending brackets for supporting wire shelves on

vertical upright posts. Each of the brackets is adapted to be attached by loop elements located along either its upper or lower portions to hook on the end of the wire shelf. When the bracket is attached to the shelf by the loop elements along its lower portion, the top of the bracket extends above the bottom plane of the shelf such as to provide an end-wall therefor and when the bracket is attached to the shelf by the loop elements along its upper portion, the top of the bracket is even with the bottom plane of the shelf such as to provide an unobstructed end therefor.

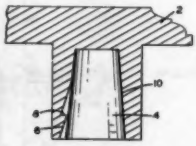
3,730,109

KNOCK-DOWN TABLE STRUCTURE

William J. Kreizel, Hewlett Harbor, and Richard T. Ciuzio, Brooklyn, both of , N.Y., assignors to Armstrong Cork Company, Lancaster, Pa.

Filed Jan. 4, 1971, Ser. No. 103,573
Int. Cl. A47b *3/05*

U.S. Cl. 108—156 **1 Claim**



A table structure is formed of four legs and a table top unit, all made from molded plastic. The legs are joined to the table top through the use of a joint structure which requires no tools to assemble and is not capable of being easily disassembled. The table top is provided with socket arrangements for receiving projections on the legs and a locking structure holds the two units in an assembled position.

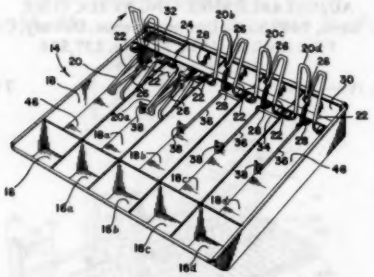
3,730,110

MONEY SPRAY APPARATUS FOR THEFT IDENTIFICATION

Willard L. Peters, 596 Elm Drive, Tallmadge, Ohio

Filed May 14, 1971, Ser. No. 143,463
Int. Cl. E05g *3/00*

U.S. Cl. 109—25 **10 Claims**



A device for marking contents of a cash register drawer when unauthorized removal of such contents is attempted. An aerosol container of a dye is housed within the cash drawer tray and discharges its contents into a manifold which leads to spray nozzles in the individual compartments of the tray. An actuating lever contacts the nozzle of the aerosol container and is connected to a rod which is biased by a compression spring to move the lever, depressing the nozzle and releasing the spray. A spring clip on the rod normally holds the spring in compressed position preventing release of the spray. The spring clip is connected by a wire to the paper holding finger or fingers of one of the compartments of the cash drawer tray. Lifting of the paper holding fingers of this compartment releases the spring clip, permitting the spring to move the rod and release the spray material.

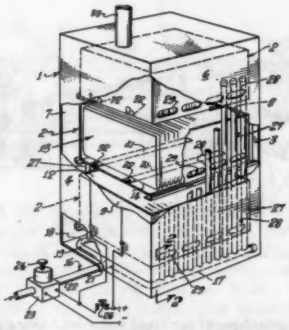
3,730,111

APPARATUS FOR THE IN-PLACE DESTRUCTION OF FILED DOCUMENTS

Donald R. Matthews, San Jose, Calif., assignor to The United States of America as represented by the Secretary of the Navy

Filed June 15, 1972, Ser. No. 263,052
Int. Cl. E05g *3/00*

U.S. Cl. 109—29 **6 Claims**



An air manifold is mounted in a file cabinet and provided with air-jet orifices arranged to direct air jets onto the bottom edge region of file folders stored in the cabinet. Means, such as a squib-activated oxidizer sheet, also are mounted in the cabinet in position to ignite the bottom edges of the folder. The system as a whole operates as a gravity-feed furnace by injecting the high velocity air jets at the bottom of the burning files and, as the bottom surfaces are consumed, the file contents fall into the region of rapid combustion.

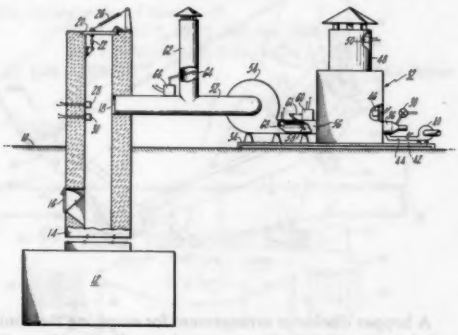
3,730,112

INCINERATION SYSTEMS AND METHODS

Bruce R. Hutchinson, Bloomfield, Conn.; Bruce H. Hunter, Longmeadow, Mass., and Robert N. Brooks, West Hartford, Conn., assignors to Silent Glan Corporation, Bloomfield, Conn.

Filed March 18, 1971, Ser. No. 125,752
Int. Cl. F23g *5/00*

U.S. Cl. 110—8 R **23 Claims**



Apparatus and control techniques for coupling afterburner-centrifugal separator devices to existing incinerators. By means of exercising control over incinerator exhaust stack draft and afterburner temperature, complete oxidation and

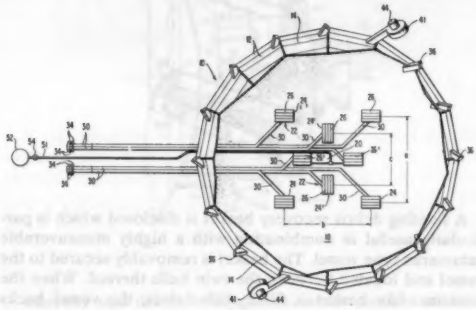
particulate separation can be achieved in an afterburner unit which may be coupled to an existing incinerator. The invention further encompasses automatic safety features including provision of a bypass for incinerator effluents in the case of any failures in the afterburner system.

3,730,113

INCINERATOR DRAFT SYSTEM

George H. Stearns, Kalispell, Mont., assignor to Rollie's Machineworks, Inc., Kalispell, Mont.

Filed July 2, 1971, Ser. No. 159,257
Int. Cl. F23g 7/00
U.S. Cl. 110.18 R **18 Claims**



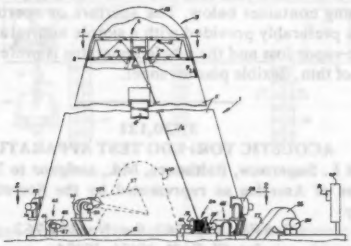
A draft system for an incinerator having a floor, upstanding walls therefrom, and a fuel feeding means mounted in the upper portion thereof, is presented. The system includes an underfire draft comprising a plurality of mutually spaced, symmetrically arrayed draft boxes mounted below the burner floor and supporting grates at the floor level. Each box is fed by a separately controlled source of forced air which is directed upwardly through the grate. The system also includes an overfire draft comprising a plurality of mutually spaced vents opening through the walls of the incinerator. Each vent is separately controlled and tangentially directed. The overfire system also may include a plurality of mutually spaced, tangentially directed blowers mounted in the walls of the incinerator. The vents and blowers of the overfire draft create a cyclonic circulation within the incinerator to facilitate uniform burning. At least one centrally located draft box may also be connected to a source of flammable gas for ignition of the material to be incinerated.

3,730,114

CONTROL SYSTEM FOR A WASTE WOOD BURNER

Raymond E. Stone, and Aubrey E. Wing, both of Springfield, Oreg., assignors to Industrial Construction Co., Ltd., Eugene, Oreg.

Filed Feb. 28, 1972, Ser. No. 229,971
Int. Cl. F23g 7/00
U.S. Cl. 110—18 R **8 Claims**



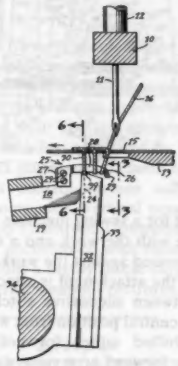
A control system for installation on existing waste burners at mill sites for the purpose of reducing emissions from the wood waste burned. A damper structure includes downwardly swingable doors positioned in response to the burner internal temperature. An under fire duct system supports combustion at the base of the waste pile while over fire blowers feed air about the perimeter of the pile in a cyclonic manner. Igniter units located about the burner shell retain burner temperature above a preset level by intermittent operation. Control means operates the systems components at preset temperatures to insure highly efficient combustion within the burner to reduce smoke and particulate emissions to a level acceptable to regulating authorities.

3,730,115

METHOD AND APPARATUS FOR TUFTING UNIFORM CUT PILE

William Erby Passons, and William R. Reese, both of c/o Broad Street Machine Company, Inc. 2014 South Broad Street, Chattanooga, Tenn.

Filed May 20, 1971, Ser. No. 145,195
U.S. Cl. 112—79 R **3 Claims**



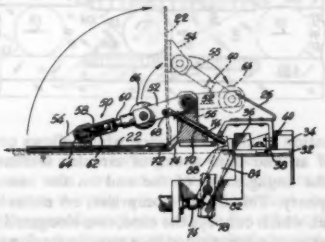
A tufting looper mechanism including a looper element or hook, a spreader element fixed proximate to the bill of the hook for receiving a tufted loop thereover, in a spread position, and a knife member, and means for reciprocably moving the looper element and knife member so that the knife member moves between the hook and spreader element to cut a spread loop held by the hook and spreader element in substantially the center thereof to form cut pile yarn ends of equal height.

3,730,116

HOLDER FOR COLLARS AND THE LIKE GARMENT PARTS

Ernst Schramayr, Dollard des Ormeaux, Quebec, Canada, assignor to Ideal Equipment Co., Ltd., Montreal, Quebec, Canada

Filed June 21, 1971, Ser. No. 154,790
Int. Cl. D05b 21/00
U.S. Cl. 112—121.15 **2 Claims**



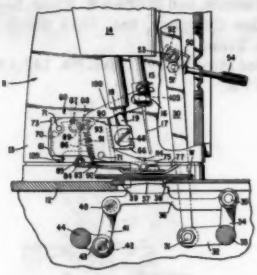
A holder for collars and the like garment parts comprising a base support, a pair of fixed platens secured to the base sup-

port, a movable platen hinged upon each of the fixed platens, and means for operating the movable platens so as to permit holding of a collar between the fixed and movable platens.

3,730,117
EVEN FEEDING ATTACHMENT FOR SEWING MACHINES

Herman O. Ritter, Karlsruhe, and Karl Weber, Leopoldshafen, both of Germany, assignors to The Singer Company, New York, N.Y.

Filed March 2, 1972, Ser. No. 231,303
Int. Cl. D05b *27/04*
U.S. Cl. 112—212 **4 Claims**

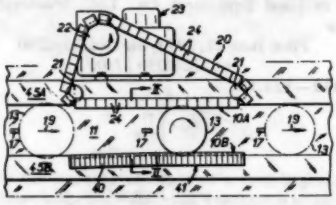


An attachment for a sewing machine in which a work feeding foot movable with the work and a stationary presser foot are alternately pressed against the work during sewing. A leaf spring carried in the attachment is attached to the work feeding foot and between successive stitches returns the work feeding foot to a central position from which the work feeding foot may be shifted either forwardly or rearwardly to cooperate with a forward or reverse direction of work feed. The leaf spring as well as the operating mechanism of the attachment is sustained in a molded support block having integral rivet studs which can be deformed after assembly to secure the attachment parts together.

3,730,118
LINEAR CLINCHING FOR ROUND CANS

Claude Del-Frate, Boulogne, France, assignor to ETS. J. J. Carnaud & Forges De Basse-Indre, Paris, France

Filed Nov. 3, 1971, Ser. No. 195,259
Claims priority, application France, Nov. 16, 1970, 7040927
Int. Cl. B21d *19/12*
U.S. Cl. 113—30 **18 Claims**

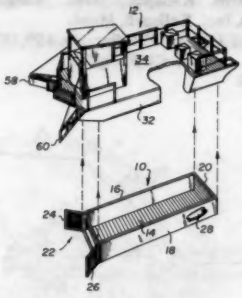


The invention relates to a device which allows continuous crimping of an end onto a can of circular section thereby providing the engagement of the end on the can along its whole periphery. This device comprises, on either side of a moving track which conveys the cans, two elongated guides of which one at least is constituted by a moving section of a chain passed in a loop on at least two pinions of which one is a drive pinion, and at least one of the guides being profiled so as at least to contribute to the desired crimping.

3,730,119
FLOATING DEBRIS RECOVERY BASKET

Allan R. Budris, Nutley, and Tadeusz A. Tokarczyk, Mount Arlington, both of N.J., assignors to Worthington Corporation, Harrison, N.J.

Filed Jan. 6, 1971, Ser. No. 104,350
Int. Cl. B63b *35/32*
U.S. Cl. 114—.5 R **12 Claims**

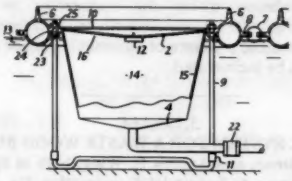


A floating debris recovery basket is disclosed which is particularly useful in combination with a highly maneuverable catamaran type vessel. The basket is removably secured to the vessel and located between the twin hulls thereof. When the container-like basket is filled with debris, the vessel backs away from the basket leaving it floating for subsequent removal. Floatation of the basket is preferably accomplished by filling hollow side walls thereof with buoyant material.

3,730,120
METHOD AND APPARATUS OF COLLECTING RAINWATER

Curzon Dobell, Nassau, Bahamas, assignor to Aquavoir Holding Company S.A., Panama, Panama

Continuation-in-part of Ser. No. 827,191, May 23, 1969, abandoned. This application March 1, 1971, Ser. No. 119,884
Int. Cl. B63b *35/00*
U.S. Cl. 114—0.5 R **4 Claims**



Use is made of the superficial area occupied by salt water lakes and lagoons for the collection of rain water by employing a floating collecting container, which is enclosed by a deck, on to which rain falls and from which it drains into the collecting container below. The aperture or apertures in the deck is preferably provided with a simple non-return valve to reduce vapor loss and the whole apparatus is preferably composed of thin, flexible plastics sheet.

3,730,121
ACOUSTIC TORPEDO TEST APPARATUS

Dwight L. Supernaw, Baltimore, Md., assignor to The United States of America as represented by the Secretary of the Navy

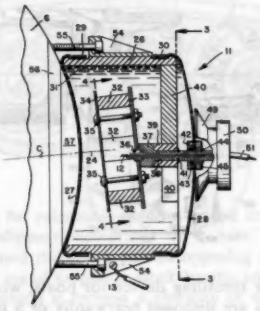
Filed Feb. 19, 1963, Ser. No. 259,762
Int. Cl. F42b *19/01, 19/04*
U.S. Cl. 114—20 **3 Claims**

2. An inverse transducer device for use in transmission of acoustic signals to the generally convexly-faced transducer of

an acoustic-homing torpedo, under test, in a manner simulating underwater target signals, said device comprising:

a hermetic housing having two opposite ends thereof formed as normally planar flexible diaphragms,

one said diaphragm serving as the face of said device, said housing being filled with liquid,



whereby said device is adapted to accommodate intimate face-to-face contact with said torpedo transducer,

an array of electro-acoustic transducer elements supported within said housing with the acoustic axis of said array extending through said face,

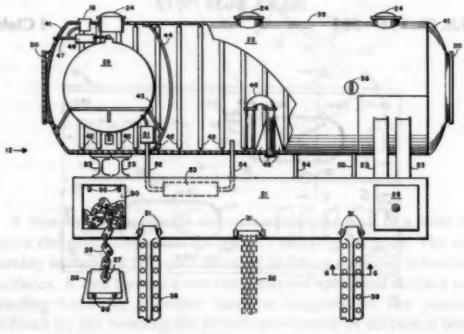
and said diaphragms and liquid having acoustic transmission characteristics substantially duplicating that of seawater.

3,730,122

SALVAGE PONTOON

William T. Odum, Panama City; James H. Elkins, Lynn Haven, and Thomas M. Coggins, Panama City, all of Fla., assignors to The United States of America as represented by the Secretary of the Navy

Filed May 5, 1971, Ser. No. 140,438
Int. Cl. B63c *7/08*
U.S. Cl. 114—53 **9 Claims**



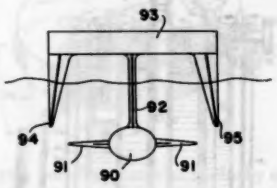
A salvage pontoon characterized by flat suction coupling plates, object attaching arms having explosive driven studs, and a cryogenic gas supply is disclosed. A ballast arrangement is disclosed to permit raising of the object and attached pontoon in controlled increments.

3,730,123

HIGH SPEED SHIP WITH SUBMERGED HULL

Thomas G. Lang, 5354 Calle Vista, San Diego, Calif.

Division of Ser. No. 20,204, March 17, 1970. This application Nov. 18, 1971, Ser. No. 200,252
Int. Cl. B63b *1/16*
U.S. Cl. 114—66.5 H **12 Claims**



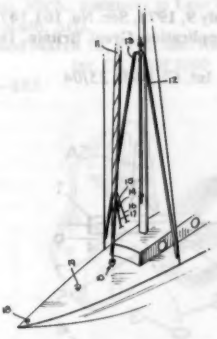
A high speed ship is formed of at least one elongate hull section submerged completely beneath the water's surface of supporting a platform above the surface waves by a plurality of struts dependent from the platform to provide support and stabilization by reason of their configuration and location. High speed dynamic pitch stability is ensured by including a stabilizer member on the aft portion of the submerged hull having a horizontally oriented control surface sufficiently sized to locate the greatest composite, vertical pressure surface substantially aft of the ship's centroid. Controlling the angle of the stabilizer member in accordance with changing wave conditions and speed provides a highly stable cargo transport capability as well as a superior weapons platform.

3,730,124

METHOD OF ADAPTING ROLLER WINGS TO OTHER SAILING CONFIGURATIONS

Wright Britton, New York, N.Y., assignor to Britton Yacht Systems, Inc., New York, N.Y.

Filed Nov. 2, 1971, Ser. No. 194,848
Int. Cl. B63h *9/04*
U.S. Cl. 114—106 **6 Claims**



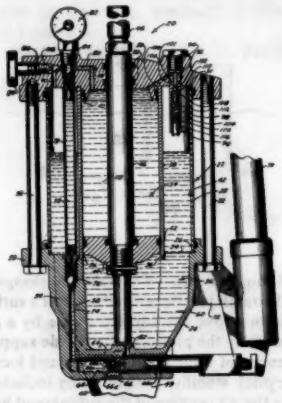
The method of converting sails called Roller Wings, which are mounted on a wire and attached attached to a furling gear and used when the only wind available is dead astern, into different sailing configurations suitable for other types of winds, by moving the furling gear to a preselected point, altering the alignment of the wings to meet the desired configuration and unfurling the wings in such a way as to achieve the new configuration.

3,730,125

HYDRAULIC BACKSTAY TENSIONER

Rudolph E. Krueger, 1201 Dolphin Terrace, Corona Del Mar, Calif.

Filed May 13, 1971, Ser. No. 143,127
Int. Cl. B63h *9/04*
U.S. Cl. 114—109 **9 Claims**



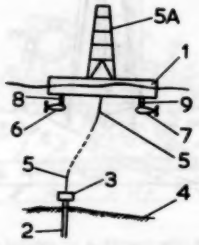
A self-contained tension adjusting device for adjusting the tension in the backstay of a sailboat includes a single housing for a pump, a hydraulic cylinder with a movable piston coupled to the backstay, and a reservoir containing hydraulic fluid. Operation of the pump forces hydraulic fluid from the reservoir to the cylinder to move the piston and adjust tension in the backstay. A bleed valve in the housing is operated to relieve tension in the backstay, and a relief valve in the housing limits the maximum tension in the backstay.

3,730,126

METHOD AND MEANS FOR DYNAMICALLY STATIONING A FLOATING VESSEL

Henricus J. Zunderdorp, and Augustinus J. Berkhout, both of Rijawijk, Netherlands, assignors to Shell Oil Company, New York, N.Y.

Filed July 9, 1971, Ser. No. 161,147
Claims priority, application Great Britain, Dec. 21, 1970, 60,590/70
Int. Cl. B63h *25/04*
U.S. Cl. 114—144 B **11 Claims**



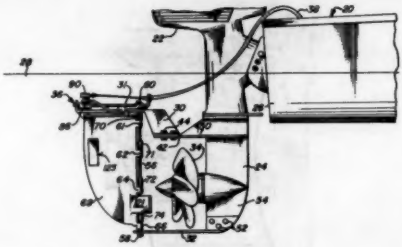
A seagoing vessel such as an offshore oil rig is dynamically stationed by measuring the actual position of the vessel with reference to a desired position, filtering the deviation or error signal to remove higher frequency components due to wave action, and using the resultant signal to control multidirectional drive means.

3,730,127

PROPELLER THROTTLING DEVICE FOR BOATS

Charles A. Pedersen, Phoenix, Ariz., assignor to Rothmans of Pall Mall Canada Limited, Toronto, Ontario, Canada

Continuation-in-part of Ser. No. 816,590, April 16, 1969, Pat. No. 3,581,699. This application May 13, 1971, Ser. No. 143,110
Int. Cl. B63h *25/48*
U.S. Cl. 114—145 A **3 Claims**



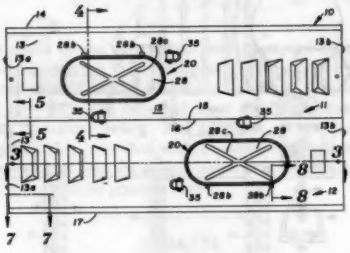
A propeller throttling device for boats, wherein a pair of pivoted vanes are disposed rearwardly of a propeller in the water, such that the vanes may be in a position to follow the propeller and may be parallel therewith or at substantially right angles thereto, so that a powerful propeller may be throttled in a manner to permit trolling operation of a boat at low speed; said vanes being pivoted by rectilinearly operated cross head and linkage structure controlled remotely by flexible shaft and lever mechanism located in the hull of a boat; said propeller throttling device being particularly adapted for use in connection with powerful outboard motors. In order to maintain optimum performance at high speeds, the throttling device is provided with means to permit limited degrees of pivoting motion to more accurately follow the wake during turns. Additionally, a trim tab and/or a small trim plate is provided on one of the pivoted vanes in order to counteract the effects of the propeller-created pressure spiral impinging on the vane at high speed which otherwise adversely affects the steering of the watercraft.

3,730,128

BARGE COVER

Rodney P. Burwell, Edina, Minn., assignor to Northwestern National Bank of Minneapolis, Minneapolis, Minn.

Filed Dec. 3, 1970, Ser. No. 94,857
Int. Cl. B63b *19/12*
U.S. Cl. 114—201 **1 Claim**

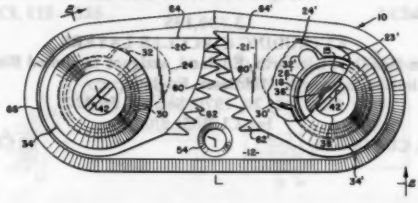


A cover for barges and the like which is formed of a relatively light weight material and is in a semi-rigid form and gains the necessary rigidity from the positioning thereof on the barge combings. The cover is formed in and from mating sections which sections interlock to form a single section. The covers are arcuate in shape to increase the capacity of the barge and door openings and lifting members are formed integrally into the covers.

3,730,129
EXTRUDED CAM CLEAT

Jack A. Helms, Columbia, S.C., assignor to Seahorse Spars and Equipment, Ltd., Suffolk, England

Filed Jan. 25, 1971, Ser. No. 109,143
Int. Cl. B63b 21/04
U.S. Cl. 114—218 7 Claims

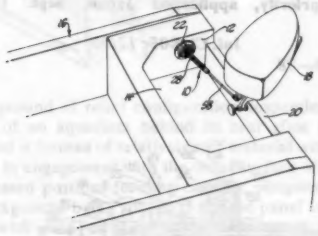


A cam cleat for releasably holding a rope line or the like against axial slippage comprised of a base plate having pivotally mounted thereon a pair of opposing cam jaws cut from extruded metal or plastic stock having an arcuate cam surface upon which is formed a plurality of wedge-shaped, rope-engaging teeth, the projecting edges of which are rounded upon a uniform and relatively small radius. An axial chamber within each jaw concentrically receives a base plate spindle and an offset chamber provides a detent for both a biasing spring and a pivot-limiting stop. Configuration of the jaw teeth is such that the rear face of each tooth is substantially perpendicular to the arcuate cam surface and a plurality of teeth on each jaw will simultaneously engage a line inserted between opposing cam surfaces. Insertion of the line is facilitated by a chamfer through the upper end of each tooth.

3,730,130
STEERING ASSEMBLY

Hans Wiegand, Boyertown, Pa., assignor to Teleflex, Inc., North Wales, Pa.

Filed Feb. 19, 1971, Ser. No. 116,849
Int. Cl. B63h 21/26
U.S. Cl. 115—18 R 17 Claims

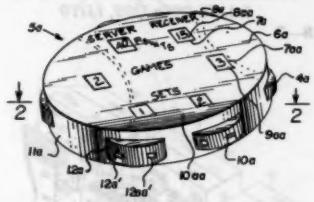


A steering assembly for securement to the wall of a boat to move the propulsion unit thereof for steering the boat. The assembly includes a two-part housing defining concave spherical surfaces. A ball having a convexly curved spherical surface extending between opposite faces is disposed in the pocket defined by the housing for swivel movement. A threaded bore extends through the ball and an elongated threaded tube extends through the bore and threadedly engages the ball. The ball has holes in one face thereof for receiving an instrument whereby the ball may be rotated to adjust the longitudinal position of the tube. A control rod is slidably supported within the tube and extends from one end thereof for attachment to the propulsion unit of the boat. The housing is circular and has holes about the periphery thereof whereby bolts extend through the holes to secure the housing to the wall of a boat.

3,730,131
TENNIS SCORE COMPUTER

Charles P. Izzo, 72 Main Street, Ridgefield, Conn.

Filed Aug. 29, 1972, Ser. No. 284,587
Int. Cl. A63b 71/06
U.S. Cl. 116—120 7 Claims

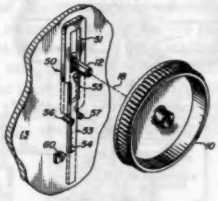


A tennis scoring portable computer manually operated by the person holding the computer, the computer including three sets of paired wheels, the handle portion of each wheel being exposed for manual manipulation such that the wheel is rotatable manually, and an indicia carrying portion of each wheel being exposable through a window for each wheel disclosing tennis-scoring indicia, the particular indicia being viewable through the window being dependent upon the position to which the wheel is turned by manual adjustment of the handle portion, one set of wheels being paired separate wheels for indicating the respective scores of opposing players for the points of a single game, the several points listed on each wheel of the points set being love, 15, 30, 40, deuce, add, and game, a second set of paired wheels one for each of opposing players includes separate positions on each wheel for scores ranging from the number one through the number seven, and the third set of wheels each having numbers corresponding to sets for each of three different positions numbered one, two, and three, the face of the computer between opposing ones of each pair identifying each of the three sets of pairs as points, games, and sets, and a first column of one of each set being identified as one tennis player and a second column of the remaining one of each pair of the three sets being identified as the other tennis player.

3,730,132
CONTROL AND INDICATOR MECHANISM

Carlton E. Brown, Tucson, Ariz., and Raymond I. Armstrong, Birmingham, Mich., assignors to Lear Siegler, Inc., Krueger Division, Tucson, Ariz.

Filed March 18, 1971, Ser. No. 125,606
Int. Cl. G09f 9/00
U.S. Cl. 116—133 3 Claims



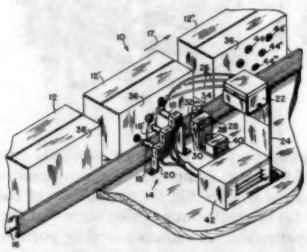
A manually rotatable knob is mounted adjacent a stationary surface for rotation with a shaft passing through a stationary panel; the knob includes a rear surface having a spiral groove therein. An indicator is pivotally secured to the panel and is positioned between the panel and the knob and includes a follower engaging the spiral grooves of the knob. The indicator also includes an arcuate opening through which the rotatable shaft passes, together with a depending pointer extending radially from the pivot point of the indicator; rotary motion of the knob results in pivotal motion of the pointer by means of the follower traveling in the grooves of the knob.

3,730,133

APPARATUS FOR REMOTE MARKING OF ARTICLES OF MANUFACTURE

Sebastiano M. Cordiano, Manville, N.J., and Paul Halpin, New York, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed March 5, 1970, Ser. No. 16,712
Int. Cl. B05c 5/00, 11/10
U.S. Cl. 118—2 1 Claim



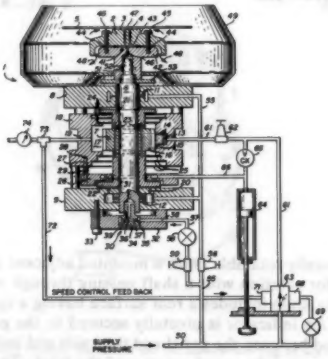
An apparatus for remote marking of articles of manufacture are described. A gun capable of ejecting cohesive liquid pulses onto article surfaces is shown. A marking liquid is supplied to the gun at a predetermined low pressure and momentarily allowed to pass into an orifice of selected length and diameter to form a traveling slug of liquid. The traveling slug of liquid rapidly advances along the orifice and attains a momentum sufficient to carry it across a gap, in the form of a cohesive liquid pulse, onto an article to be marked. The liquid pulse is free from atomization and retains its cohesiveness until it impacts on the surface of the article where the liquid pulse is flattened without splatter into a sharply defined generally round mark. Photoluminescent components may be employed in the marking liquid to provide automatic detection capability of the marked articles. Rapid successive firing of the gun enables the generation of patterns of marks for article serial number identification and the like.

3,730,134

PNEUMATIC WAFER SPINNER AND CONTROL FOR SAME

Frank G. Kadi, 282 Walker Drive, Mountain View, Calif.

Filed Dec. 17, 1970, Ser. No. 99,149
Int. Cl. B05c 11/10
U.S. Cl. 118—6 8 Claims



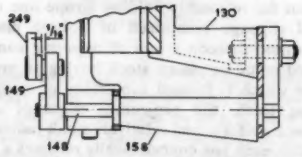
A pneumatic wafer spinner and pneumatic control for same are disclosed. The pneumatic wafer spinner includes a vacuum chuck affixed to a spindle with the vacuum supplied to the chuck from a venturi disposed in the spindle and supplied with a flow of fluid, such as gas, under pressure. The chuck is rotated by means of a pneumatic turbine. Pneumatic bearings provide support for the spindle. Exhaust back pressure on the turbine is sensed and fed to a pilot valve for controlling the speed of the spindle and chuck. A pneumatic accumulator timer is employed for operating a pneumatic clutch for selectively braking rotation of the chuck and spindle after an elapsed time determined by the accumulator.

3,730,135

EXTRUDING CIRCULAR LAYERS

John Handley, Isleworth, England, assignor to United Biscuits Limited, Isleworth, Middlesex, England

Filed July 20, 1970, Ser. No. 56,422
Int. Cl. B05c 5/00
U.S. Cl. 118—16 2 Claims



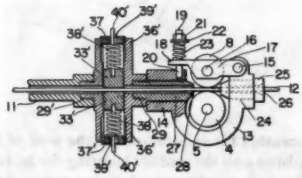
A cake making machine slices the cake into layers, separates the layers, extrudes a filling onto the lower layer and replaces the upper layer. The extruder is a head which rotates about an axis which is normal to the demarkation plane between the layers. Its orifice is a slot extending outwardly from the axis of rotation of the extrusion head. The width of the slot varies along its length so that the thickness of the layer, extruded through the slot during the rotation of the head, is constant.

3,730,136

CONSUMABLE ELECTRODE ARC WELDING MACHINE

Toshihiko Okada, Osaka-fu, Japan, assignor to Osaka Transformer Co., Ltd., Osaka-shi, Osaka-fu, Japan

Filed Sept. 16, 1970, Ser. No. 72,598
Claims priority, application Japan, Sept. 16, 1969, 44/72741
Int. Cl. B05c 11/00
U.S. Cl. 118—78 11 Claims



A electrode wire feeding device adapted for use in a consumable electrode arc welding machine, wherein the wire feeding device is provided with a lubricant feeder for effecting a smooth movement of such wire in a length of hollow guide tubing connecting between said feeding device and a suitable welding torch. In the lubricant feeder, a solid lubricant is employed which can be finely pulverized under friction in contact with the moving wire, whereby the frictional resistance between the wire and the hollow guide tubing can be substantially reduced.

3,730,137

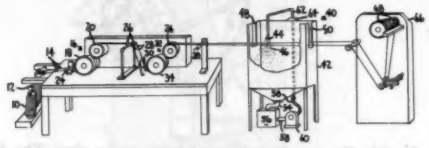
APPARATUS FOR COATING AND IMPREGNATING TEXTURIZED YARN

Paul Luscher, 1102 West Elm Street; Ben A. Hudson, 1102 Mark Drive, both of Shelby, N.C., and Billie W. Childers, Route 1, Box 38C, Forest City, N.C.

Division of Ser. No. 872,056, Oct. 29, 1969, Pat. No. 3,672,947. This application Aug. 2, 1971, Ser. No. 168,445

Int. Cl. B44d *1/08;* **D02g** *3/36*

U.S. Cl. 118—325 **2 Claims**



An apparatus for producing a texturized, binder-containing yarn produced by applying binder material to a texturized yarn through a jet spray nozzle.

3,730,138

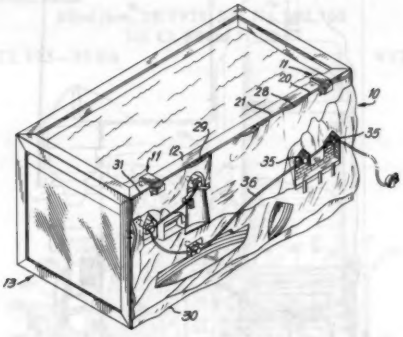
THREE DIMENSIONAL AQUARIUM BACKGROUND

Bernard Suchowski, New York, N.Y., assignor to Sternco Industries, Inc., Harrison, N.J.

Filed Aug. 25, 1971, Ser. No. 174,782

Int. Cl. A01k *63/00*

U.S. Cl. 119—5 **10 Claims**



A background of relief configuration suspended from the top edge of an aquarium behind its rear glass panel. The background is formed of relatively stiff material with high portions held in engagement with the outer surface of said panel, and depressed portions forming cavities, peripheral portions of the background being spaced from said panel and communicating with said cavities to provide ventilation, some depressed portions supporting electric light sockets with bulbs disposed within said cavities to illuminate the walls thereof.

3,730,139

CONVERTIBLE BIRD HOUSE & FEEDER

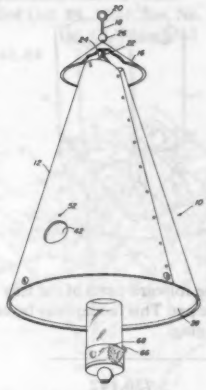
Harrington Moore, Hidden Harbor, Stuart, Fla.

Filed Feb. 9, 1972, Ser. No. 224,688

Int. Cl. A01k *31/00*

U.S. Cl. 119—23 **8 Claims**

A conical shaped housing is provided with an internal partition dividing the housing into two chambers and formed with a central opening at its lower portion. A telescopic feeding tube is mounted to the base of the housing and in its lowered position serves as a perch and feeding station for birds when the housing is filled with seeds. The unit is converted into a bird house by emptying it of bird seed, pushing the feeding tube upwardly to close the partition opening and then removing cover plates from access openings formed in the sides of the housing.



A movable lid is provided at the apex of the housing to permit feed to be poured into the housing and cooperates with a cutaway portion of the housing to vent the interior of the unit.

3,730,140

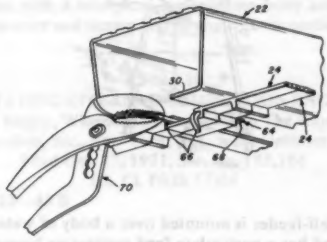
SLAT FLOOR ASSEMBLY

John O. Bowser, Natrona Heights, and Nicholas I. Moga, Pittsburgh, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Sept. 1, 1971, Ser. No. 177,135

Int. Cl. A01k *1/00*

U.S. Cl. 119—28 **6 Claims**



A floor assembly is provided which is formed from a plurality of downwardly-open channel members arranged in parallel spaced relation and interconnected by means of pairs of adjacent connecting straps which are moved into position from opposite directions transverse to the longitudinal axes of the channels whereby attachment ears on the straps engage over edge flanges on the channel members. The connecting straps may have aligned keyways in them for receiving locking keys which lock the straps and the channel members together to form a rigid floor assembly.

3,730,141

PET FEEDER

Jim L. Manning, Seaside, and Richard D. Manning, San Jose, both of Calif., assignors to John M. Klein, Winter Park, Fla., part interest

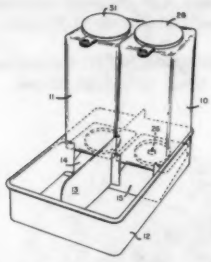
Continuation-in-part of Ser. No. 106,697, Jan. 15, 1971, abandoned. This application March 30, 1972, Ser. No. 239,472

Int. Cl. A01k *5/00, 7/00*

U.S. Cl. 119—51.5 **2 Claims**

A unitary portable pet feeder which has two storage removable containers, one of which holds a predetermined quantity of water and the other of which holds a supply of dry

pet food. The water and dry food containers feed water and dry food automatically into compartments of a tray to which

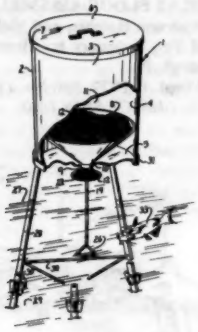


they are attached. The forward parts of the tray are open so as to be accessible to the pet. This feeder may be easily disassembled for periodic cleaning.

3,730,142
FISH SELF-FEEDER

James W. Kahrs, and Paul E. Osborn, both of Osage Beach, Mo., assignors to Mor-Fish-Ent, Inc., Osage Beach, Mo.

Filed April 20, 1971, Ser. No. 135,589
Int. Cl. A01k *5/02, 64/00*
U.S. Cl. 119—54 **8 Claims**



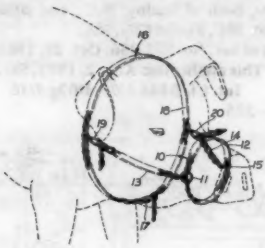
A fish self-feeder is mounted over a body of water containing fish and has a particulate feed containing hopper consisting of a tapered receptacle containing a funnel having the spout directed through an opening in the bottom of the container. A pendulum rod hangs vertically from the center of the spout by means of a suspension pin hooked into opposed openings in the spout. A feeder plate is adjustably positioned vertically on the rod forming a spaced obstruction for feed particles falling through the spout. The lower end of the pendulum terminates in a submerged bumper head which, when disturbed by the fish, causes a relative motion between the feeder plate and funnel spout, thereby producing a partial discharge of feed into the water.

3,730,143
HALTER FOR PIGS

Gordon Alfred Knight, Fairwinds, Drakes Broughton, and Raymond Sheasby, Walcot Farm, Drakes Broughton, both of Pershore, England

Filed March 5, 1971, Ser. No. 121,338
Claims priority, application Great Britain, March 20, 1970, 13,662/70
Int. Cl. A01k *25/00*
U.S. Cl. 119—130 **2 Claims**

A halter to be worn by pigs, particularly weaning sows, to restrict or prevent fighting and aggressive biting while allowing the animal to move freely and eat and drink includes a noose which can be selectively adjusted in girth when placed round the muzzle of the pig to limit opening of its jaws.

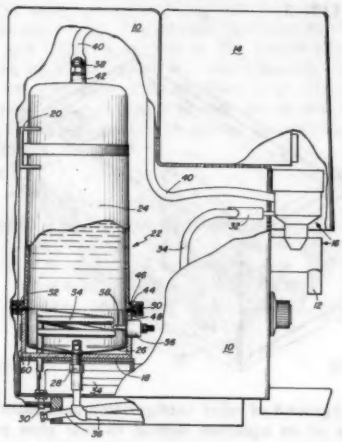


Preferably the noose is formed with a slip ring. The halter further includes a collar for the pig's neck to which the noose is secured.

3,730,144
HOT WATER TANK

William A. Arzberger, Medfield, Mass., assignor to Jet Spray Cooler, Inc., Waltham, Mass.

Filed Feb. 17, 1972, Ser. No. 227,495
Int. Cl. F22b *5/00*
U.S. Cl. 122—13 A **6 Claims**



A hot beverage dispenser is provided with an improved tank for storing water and for maintaining the water at the proper hot temperature. The tank is formed in a pair of separable components including a metallic bottom section and a transparent upper plastic section. An internal heating element is disposed within the bottom section together with an adjacent thermostatic control. The bottom metal tank section is insulated.

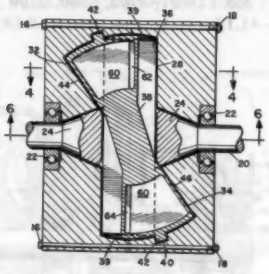
3,730,145
ROTARY ENGINE

Harold H. Bennetto, 10805 Trent Way, La Mesa, Calif.

Filed April 19, 1971, Ser. No. 134,963
Int. Cl. F02b *53/00*
U.S. Cl. 123—8.41 **9 Claims**

A rotary engine having a flywheel-like rotor rotating in a cylindrical chamber in a casing, the rotor having a diametrical slot in which is mounted a vane acting as a piston element. The vane moves with a rocking motion in a cylindrical chamber

inclined to and extending on opposite sides of the rotor chamber, the vane chamber having an inlet and outlet, and ignition means positioned so that intake and compression action



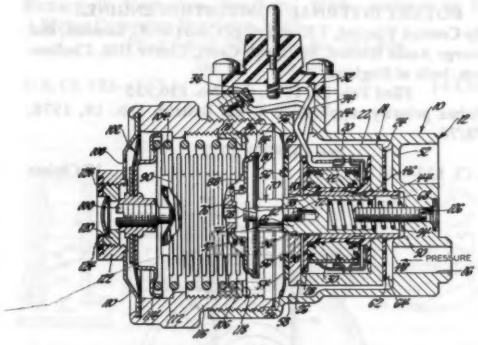
is taking place on one side of the rotor, while power and exhaust action is taking place on the other side. The engine is adaptable to a variety of fuels and may be ganged in multiple units.

3,730,146

PRESSURE-INDUCTANCE TRANSDUCER

John W. Moulds, Penfield, and Edwin C. Storey, Rochester, both of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 29, 1971, Ser. No. 202,760
Int. Cl. F02m *51/00*
U.S. Cl. 123—32 EA **6 Claims**



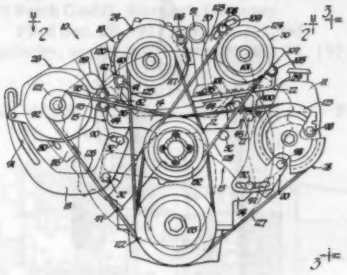
In an electronic fuel injection system, a transducer for converting a variable pressure signal to a variable inductive signal has a coil wound on a plastic spool and surrounded by a ferrite cup and cap. A nickel plated steel sleeve snaps into the spool and supports a Teflon coated steel plunger which is tapered to provide a variable air gap with the ferrite cap. This assembly is resiliently supported in a housing and is operated through a bimetallic disc from an evacuated bellows responsive to the absolute pressure in the engine air induction passage. The bellows is positioned by a diaphragm which also is responsive to induction passage pressure to provide power enrichment. Adjustments are provided for the idle, power cut-in, and wide open throttle points and for initial calibration of the transducer.

3,730,147

ENGINE ACCESSORY ARRANGEMENT

Robert M. Buchwald, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 29, 1971, Ser. No. 193,652
Int. Cl. F01p *5/10*
U.S. Cl. 123—41.44 **16 Claims**



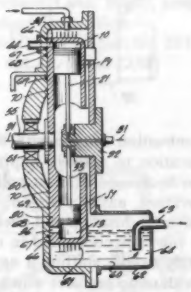
The illustrated unitized engine accessory drive arrangement includes an integral water pump body and water cross-over casting and one main selectively formed mounting bracket, the integral casting and the main bracket being cooperable with three smaller brackets to accommodate all of the conventional engine accessory units, as well as the various respective models available. Such an arrangement requires a total inventory of a substantially smaller number of brackets, belts, and related parts than is the case for current engines and their varied selection of accessory models. An alternate embodiment utilizes the above-described four mounting brackets in conjunction with a two-piece water pump body and integral water cross-over and timing belt or chain cover casting.

3,730,148

ROTATING INTERNAL COMBUSTION ENGINE

James M. Bagby, Wheaton, Ill., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Oct. 27, 1971, Ser. No. 193,104
Int. Cl. F02b *57/04*
U.S. Cl. 123—43 R **5 Claims**



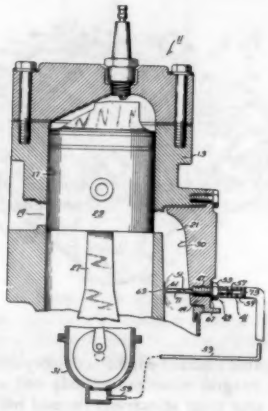
A rotating internal combustion engine, in which each power cylinder and piston is paired with a slave cylinder and piston, said slave piston and cylinder furnishing compressed air to scavenge the power cylinder of exhaust gases and to increase the amount of air in the power cylinders for purpose of super charging said power cylinders.

3,730,149

DRAIN RETURN FOR ENGINE

Peter W. Brown, Zion, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Jan. 21, 1971, Ser. No. 108,265
Int. Cl. F02b 33/04
U.S. Cl. 123—73 R 7 Claims



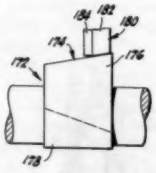
Disclosed herein is a two-stroke internal combustion engine with a drain return system comprising a drain return line which is supported by wall means defining a fuel supply passage and which extends from a crankcase and includes an end part terminating in adjacently spaced opposing relation to one portion of the wall means, whereby drains exiting from the drain return line splash against the wall portion and are broken into droplets for delivery to the engine cylinder.

3,730,150

METHOD AND APPARATUS FOR CONTROL OF VALVE OPERATION

Stephen J. Codner, Jr., 4976 Derby Place, Newark, Calif.

Filed Oct. 20, 1971, Ser. No. 190,919
Int. Cl. F01l 1/34, 11/00
U.S. Cl. 123—90.18 1 Claim



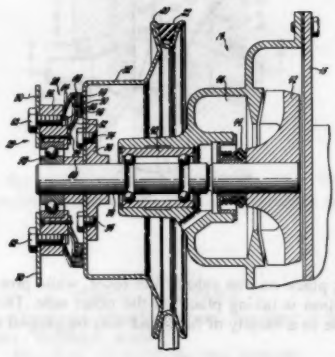
An internal combustion engine with means to selectively control valve operation to achieve improved operating efficiency resulting in decreased exhaust pollution, added power and faster acceleration, easier start-up, and smoother idle. The amount of valve lift duration and overlap between the exhaust and intake valves is controlled in one embodiment by means of selectively axially shifting a camshaft formed with lobes contoured with ramp surfaces which vary in axial extent. Shifting of the cam carries the lobes into operating relationship with their associated valve operating means so that in one position a predetermined lobe ramp contour produces a relatively short overlap period for optimum engine operation at start-up, idling and low speed conditions, and at progressively axial spaced camshaft positions varied lobe ramp contours are moved into operating relationship with the cam followers to cause an increase in valve overlap for optimum operation at high speed engine conditions.

3,730,151

TEMPERATURE-RESPONSIVE CLUTCH

Claude A. Smith, Sandusky, and Donald L. Williams, Port Clinton, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed April 19, 1971, Ser. No. 135,186
Int. Cl. F01p 7/02; F16d 11/00
U.S. Cl. 123—41.12 3 Claims



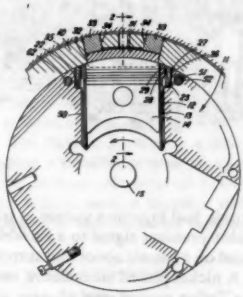
A temperature-responsive clutch including sets of two cooperating leaf springs, one set of which is steel and the other of which is nickel-titanide, or NiTi, to effectively engage and disengage clutch faces above and below a predetermined temperature. The characteristics of NiTi are utilized in the structure such that the steel leaf springs provide the disengaging force, while the NiTi leaf springs provide the engaging force, each successfully overcoming the other as required, in response to temperature changes.

3,730,152

ROTARY INTERNAL COMBUSTION ENGINES

Philip Conrad Vincent, 7 Kew Bridge Court W.4., London, and George Amos Hinton, Stockwell Croft, Cleeve Hill, Cheltenham, both of England

Filed Feb. 19, 1971, Ser. No. 116,955
Claims priority, application Great Britain, Feb. 19, 1970, 8,078/70
Int. Cl. F02b 57/00
U.S. Cl. 123—44 R 18 Claims



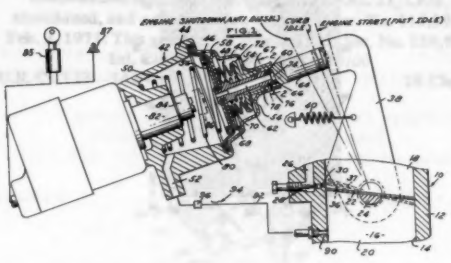
The disclosure relates to rotary internal combustion engines in which a cylinder assemblage having radial cylinders rotates within an annular ported structure having inlet and outlet ports. A sealing member encircles the outer end of each cylinder and is mounted on the assemblage for movement towards and away from the ported structure and means are provided for maintaining sealing members at a minimum distance away from the ported structure..

3,730,153

CARBURETOR THROTTLE VALVE POSITIONER

Robert S. Harrison, Detroit, and Harold E. Marcum, Dearborn, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed July 6, 1971, Ser. No. 159,892
Int. Cl. F02d 11/08; F02b 77/08; F02m 3/02
U.S. Cl. 123—103 R 6 Claims



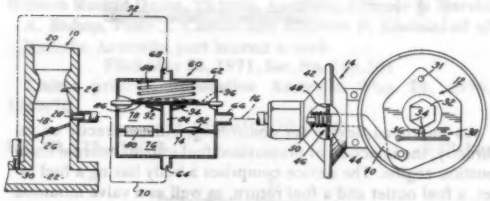
A downdraft type carburetor has an idle system discharge port that is straddled by the normal idle speed and closed throttle positions of the throttle valve so as to permit idle speed fuel and air flow in one position and no flow in the other position; a third beyond normal idle, or fast idle speed position is provided for engine startup; the three positions are controlled by a servo operatively engaging the throttle valve; the servo operation is controlled by intake manifold vacuum to initially close the throttle valve upon engine shut off, with a subsequent return of the throttle valve to its fast idle position for engine restarting, or to return the throttle valve to a normal idle position upon release of the vehicle accelerator pedal during engine operation.

3,730,154

ENGINE SPARK TIMING CONTROL

Richard D. Vartanian, Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Feb. 2, 1972, Ser. No. 222,886
Int. Cl. F02p 5/06
U.S. Cl. 123—117 A 14 Claims



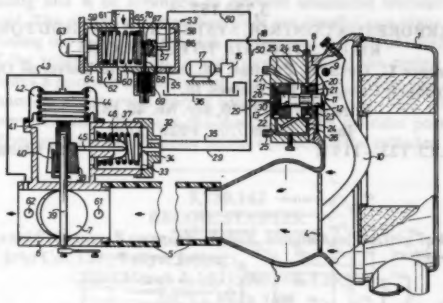
The ignition timing includes a distributor having a vacuum controlled servo actuator to advance the timing as a function of changes in carburetor spark port vacuum, the servo normally spring biasing the distributor towards a minimum advanced or retarded timing position; the vacuum line from the spark port including a device that is operative (1) during light vehicle accelerations to delay the spark advance by delaying vacuum application to the servo, (2) during heavy accelerations to immediately retard the ignition timing by transferring the higher spark port pressure signal directly to the servo; (3) to provide an immediate retarded ignition timing during vehicle decelerations by directly communicating spark port pressure level to the servo; (4) to provide immediate return of the timing to an advance setting after momentary decelerations by again directly connecting the spark port pressure level to the servo; and, (5) to provide normal spark advance during cold weather operation by directly connecting the spark port vacuum to the servo; the above providing low emissions and good vehicle performance during all operating engine conditions.

3,730,155

FUEL INJECTION APPARATUS FOR SPARK PLUG-IGNITED INTERNAL COMBUSTION ENGINES

Heinrich Knapp, 725 Leonberg-silberberg, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Dec. 28, 1971, Ser. No. 212,955
Claims priority, application Germany, Jan. 11, 1971, P 21 00 935.8
Int. Cl. F02m 69/00
U.S. Cl. 123—119 R 5 Claims



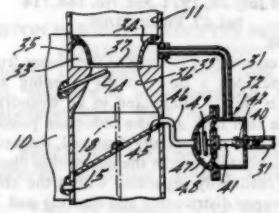
In a fuel injection apparatus the air-fuel ratio is controlled by an air sensor which is deflected against a return force by the intake air and which, as a function of the extent of its deflection, controls the output of a fuel metering valve. To ensure a leaner fuel mixture subsequent to a cold engine start, there is provided a first temperature-dependent control element which is responsive to the water coolant temperature and, upon the increase of the latter, causes an increase in the bias of a spring augmenting, in turn, said return force to bring about a leaner fuel mixture and a second temperature-dependent control element which is responsive to a separate heater means and which, for a very short period subsequent to the starting of the cold engine, hinders said first temperature-dependent control element to increase said bias.

3,730,156

EXHAUST GAS RECYCLING

Jorma O. Sarto, Orchard Lake, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Nov. 24, 1971, Ser. No. 201,826
Int. Cl. F02m 25/06
U.S. Cl. 123—119 A 10 Claims



An automobile engine recycles a fraction of its exhaust gases by means of a restricted bypass duct discharging into the fuel-air inlet conduit at the diffuser region of the customary fuel inducing venturi restriction. The recycled exhaust gas flow is modulated by the pressure differential across a meter-

ing restriction between the exhaust gas source and the venturi restriction. A supplemental control valve responsive to the pressure differential between the venturi restriction and a control port, which opens into the inlet conduit immediately above the leading edge of a conventional butterfly type throttle valve, is employed in the bypass duct to close or restrict the latter when the throttle valve is at either its idle or wide open position. The source of exhaust gas for recycling may comprise comparatively cool exhaust gases collected in a dead-end sound attenuating chamber of the exhaust muffler, which chamber is in communication with the hot exhaust gases in the muffler but is out of the direct exhaust flow path, such that lead contaminants in the exhaust gases cool and solidify in the chamber as minute particles that readily flow through the metering restriction in the bypass duct.

3,730,157

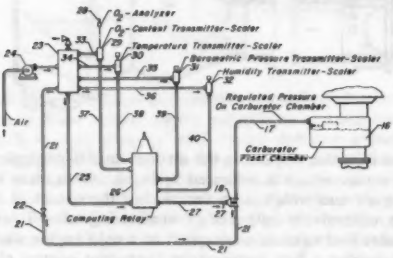
CARBURETOR CONTROL SYSTEM AND METHOD FOR REGULATING AIR TO FUEL RATIO

Clarence G. Gerhold, Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed May 25, 1970, Ser. No. 40,182

Int. Cl. F02m *7/00*; **F02b** *33/00*

U.S. Cl. 123—119 R **13 Claims**



As a means of providing improved control of the air-fuel ratio to an internal combustion engine for, in turn, maintaining control of the exhaust gas properties there is a regulation of fuel input responsive to a pressure exerted on the fuel in the carburetor float chamber. Sensing means are provided to be responsive to ambient conditions and/or to a given exhaust gas component. Such sensors, along with transmitter means, are integrated into the system to have fuel flow increased or decreased by pressure in the float chamber proportional to the net effect of having an increasing or decreasing quantity of O_2 present.

3,730,158

CANISTER FOR EVAPORATION LOSS CONTROL

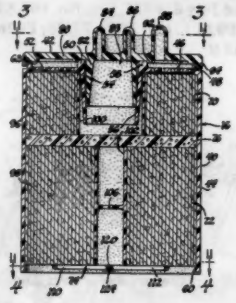
James C. St. Amand, Spencerport, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed July 28, 1971, Ser. No. 166,714

Int. Cl. F02m *25/00*

U.S. Cl. 123—136 **3 Claims**

A canister for controlling the loss of fuel vapor from a vehicle fuel tank includes a downwardly opening adsorption chamber which is fluidly connected in an evaporative flow path between the fuel tank and the induction passage of the vehicle engine. A pair of coaxially disposed, discardable cartridges are releasably retained in the adsorption chamber, the cartridges being resiliently separated within the chamber by an intermediate vapor distributing and filtering pad. Each cartridge includes a hollow core around which an activated charcoal filled sheet is wrapped to form a filtering element conforming to the shape of the chamber. Fuel vapor from the fuel tank flows downwardly through the core of the upper or anti-surge cartridge to the distributing and filtering pad which radially spreads the flow for downward dispersion into the lower or storage cartridge. During engine operation, the stored fuel vapor is initially drawn upwardly from the storage cartridge to the anti-surge cartridge and dispersed therewithin to prevent



surging as fuel vapor is purged from the canister to the induction passage.

3,730,159

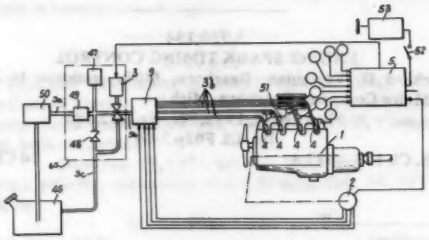
FUEL INJECTION DEVICE FOR INTERNAL COMBUSTION ENGINES

Georges Sallot, Elisabethville, France, assignor to Societe Des Procedes Modernes D'Injection Sopromi, Les Mureaux, France

Filed Dec. 17, 1971, Ser. No. 209,227

Int. Cl. F02m *39/00*

U.S. Cl. 123—136 **7 Claims**



An improved device for controlling, either directly or indirectly, the injection of pressurized fuel into an internal combustion engine. The device comprises a body having a fuel inlet, a fuel outlet and a fuel return, as well as a valve mounted therein. The valve is actuated by an electromagnet and is adapted to establish communication between the fuel inlet and the fuel outlet when the valve is actuated. The device has a fuel accumulator comprising an opening in one side of the body and a diaphragm mounted across the opening to form an enclosed volume within the body. The enclosed volume communicates with the fuel input so that the diaphragm deflects outwardly with respect to the interior of the body in response to increases in the pressure of the pressurized fuel provided to the fuel input. The improvement comprises a pressure regulator having a regulatory valve disposed within the body and actuated by the diaphragm. The regulatory valve has an input in communication with the enclosed volume and an output in communication with the fuel return. The regulatory valve is adapted to establish communication between the enclosed volume and the fuel return when the pressure of the pressurized fuel in the enclosed volume reaches a predetermined value.

3,730,160

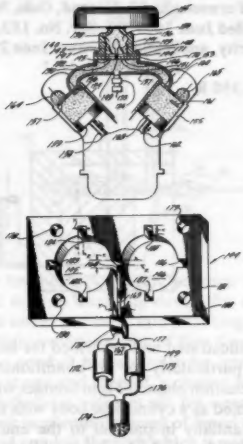
ENERGIZATION OF THE COMBUSTIBLE MIXTURE IN AN INTERNAL COMBUSTION ENGINE

Nathaniel Hughes, Rolling Hills Estates, Calif., assignor to Energy Sciences Incorporated, El Segundo, Calif.

Continuation-in-part of Ser. No. 855,321, Sept. 4, 1969, abandoned, and a continuation-in-part of Ser. No. 13,977, Feb. 25, 1970, abandoned, and a continuation-in-part of Ser. No. 17,484, March 9, 1970, Pat. No. 3,613,722, and a continuation-in-part of Ser. No. 82,771, Oct. 21, 1970, abandoned, and a continuation-in-part of Ser. No. 111,995, Feb. 2, 1971. This application July 1, 1971, Ser. No. 158,915

Int. Cl. F02m *27/00, 27/08, 29/00*

U.S. Cl. 123—142 **10 Claims**



Engine vacuum is used to draw a stream of air into the intake system. Some of the energy of this air stream is converted to pressure waves. The flow rate of the air stream is controlled responsive to the mode of engine operation to provide the proper amount of pressure wave energy.

3,730,161

ROTARY VALVE

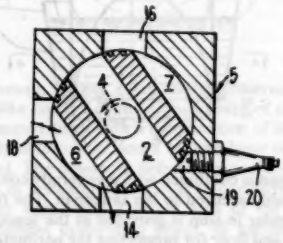
William Ronald Deane, Victoria, Australia, assignor to Harold A. Bishop, Peter J. Curran and Matthew P. Sinclair, all of Victoria, Australia, part interest to each

Filed May 28, 1971, Ser. No. 148,101

Claims priority, application Australia, May 29, 1970, 1358/70

Int. Cl. F01l *7/10, 7/14*

U.S. Cl. 123—190 D **9 Claims**



A rotary valve preferably for controlling flow of fuel/air mixture to, and exhaust gases from, the cylinder of an internal combustion engine. The valve comprises a casing having a cylinder port and a diametrically opposite exhaust port. A spherical rotor is mounted to rotate within the casing and has a diametrically extending through passage extending at right angles to the axis of rotation of the rotor, which passage aligns with the cylinder and exhaust ports during its rotation. The rotor further includes two channels on either side of the rotor which extend substantially parallel with the through passage. The casing further has an inlet port positioned, using the direction of rotation of the rotor as a datum, before the cylinder port. The lengths of the channels are greater than the distance between the inlet and the cylinder ports so at certain times during rotation of the rotor it will bridge the two ports to allow transfer of a fuel/air mixture from the inlet through the channel to the cylinder port. The outer dimension of the rotor is substantially less than the corresponding internal dimension of the casing, whilst at least one sealing ring is positioned within a groove around the rotor between each channel and the through passage, and is biassed towards a position in running sealing engagement with the internal surface of the casing and is so arranged to prevent undesired transfer of fluid. The planes of the sealing rings are parallel to a plane including the axis of the through passage and the axis of rotation of the rotor. Where an ignition device is used the casing includes a port for it, positioned after the cylinder port and the channels at intervals during rotation of the rotor will allow communication between the device and the cylinder port to allow ignition of the fuel/air mixture passed to the cylinder.

3,730,162

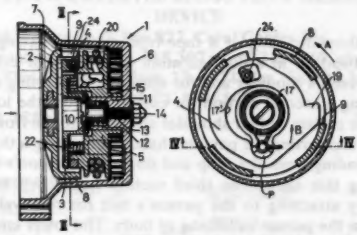
RECOIL STARTER

Kenaki Murase, Kawaguchi, Japan, assignor to Starting Industrial Co., Ltd., Tokyo, Japan

Filed March 4, 1971, Ser. No. 120,979

Int. Cl. F02n *3/02*

U.S. Cl. 123—185 BA **3 Claims**



A recoil starter wherein the driving ratchet is maintained in a retracted inoperative position during the operation of the engine.

3,730,163

PISTON FOR INJECTION TYPE INTERNAL COMBUSTION ENGINES

Gunter Elsbett, and Ludwig Elsbett, both of Hilpaltstein, Germany, assignors to Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft Werk Nurnberg, Nurnberg, Germany

Filed April 7, 1971, Ser. No. 132,094

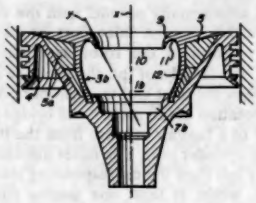
Claims priority, application Germany, April 7, 1970, P 20 16 386.4

Int. Cl. F02f *3/02, 3/14, 3/26*

U.S. Cl. 123—193 P **11 Claims**

A piston for injection type internal combustion engines, which has the bottom surface forming part of the main combustion chamber provided with a piston chamber in which an insert member defining a supplemental combustion chamber is inserted while an intermediate member is interposed

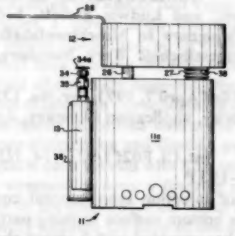
between said insert member and the piston body portion defining said piston chamber, said intermediate member having zones of constant or different thermal conductivities according to a predetermined heat pattern.



3,730,164
ORTHOPEDIC SLING
Caroline M. Rash, 1200 Kenilworth Avenue, Racine, Wis.
Filed Jan. 21, 1972, Ser. No. 219,808
Int. Cl. A61f 5/40
U.S. Cl. 128—94 **6 Claims**

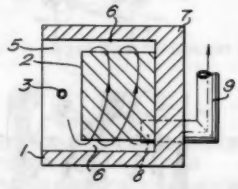
An orthopedic sling of a tape-type material having a first section disposed in a configuration of a loop for extending over a person's shoulder and for upwardly supporting an arm, and having a second section for extending from the loop and across the person's other shoulder and down to the front of his body for supporting the person's hand, and having a third section extending from the loop and down to a person's belt for anchoring this sling. The third section has a belt loop for releasably attaching to the person's belt for removal of the sling from the person's clothing or body. The lower end of the second section has a hand-supporting portion with a thumb hole for anchoring on to the person's hand.

3,730,165
PORTABLE LIQUID HEATER AND FOOD WARMER
Garold H. Williams, 43 West 100 South, Smithfield, Utah
Filed June 28, 1971, Ser. No. 157,490
Int. Cl. F23c 1/00
U.S. Cl. 126—266 **1 Claim**



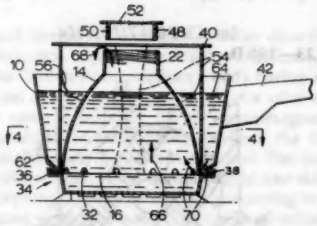
A portable heater and food warmer unit wherein water, coffee or other liquid and food can be simultaneously heated by a flame generated either from a gas fired burner or from a canned heat source. Surplus heat passed through a liquid heater is directed through an upstanding exhaust vent in a housing of the invention, on which a warming cup containing a food item to be heated can be positioned. The warming cup, when not in use, fits snugly over the top of the housing, and a pressurized cylinder, which may be used as a fuel source can be mounted on the side of the housing. The unit, fits in a carrying pouch which is attached to a belt worm around the hips of a camper or hiker like a conventional canteen.

3,730,166
APPARATUS FOR HEATING WATER BY MEANS OF AN OILBURNER
Torleif Gran, Furuset Alle 23, Grorud, Oslo, Norway
Filed June 16, 1971, Ser. No. 153,606
Claims priority, application Norway, June 27, 1970, 2531
Int. Cl. F24h 1/12
U.S. Cl. 126—350 R **3 Claims**



A means is illustrated and described for heating water with an oilburner, particularly for air conditioning units and the like. The combustion chamber is in contact with a water reservoir and is formed as a cylindrical body with the burner nozzle directed substantially in parallel to the end surfaces of the combustion chamber and somewhat oblique with respect to the line of connection from nozzle to cylinder axis. An annular chamber is connected to the end surface of the combustion chamber and the combustion chamber and annular chamber are formed with uniform surfaces.

3,730,167
NON BOIL-OVER COOKING ASSEMBLY
Dominique Patrice Desarzens, 89 Rameau Dr., Unit 7, Willowdale, Ontario, Canada
Filed Feb. 25, 1971, Ser. No. 118,711
Int. Cl. A47j 27/58
U.S. Cl. 126—386 **7 Claims**



A saucepan is combined with a generally conical safety-funnel detachably secured to the saucepan. The funnel is plastic and an annular in-step is provided at the junction of the saucepan wall and floor for supporting the perimeter of the funnel spaced above the floor and away from direct heat contact. The funnel is reversable and the small end capped to function as a separate hot liquid (or solid) heater within the outer saucepan which can at the same time be cooking something else. A ring of spaced apertures around the big funnel end provides circulating passage between the contents of the interior of the funnel and those in the surrounding saucepan.

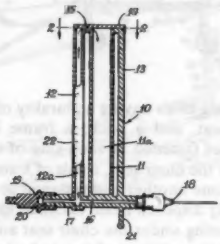
ERRATUM

For Class 128—94 see:
Patent No. 3,730,164

3,730,168
MANOMETER

Daniel M. McWhorter, Arlington Heights, Ill., assignor to The Kendall Company, Boston, Mass.

Continuation-in-part of Ser. No. 653,548, July 14, 1967, abandoned. This application Sept. 10, 1970, Ser. No. 71,232
Int. Cl. A61b 5/10
U.S. Cl. 128—2 F **15 Claims**

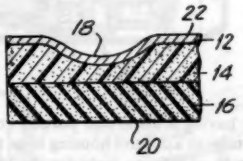


A manometer for measuring liquid pressure having a channel which opens into an attaching device for connecting the channel to liquid under pressure, said attaching device including a conduit which provides a path of flow for said liquid into the channel. The conduit has a needle for introducing liquid into the conduit at one end thereof, a closure at the other end thereof which includes a valve or slit for opening said other end of the conduit to permit drainage of liquid therefrom, and an opening in said conduit through which liquid may enter the channel from the conduit. Liquid pressure is indicated by the amount of travel of the liquid in said channel.

3,730,169
SHOE INNER SOLE AND ORTHOPEDIC SUPPORT

Theodore Fiber, 20 Rosewood Lane, Wantagh, N.Y.

Filed March 8, 1971, Ser. No. 122,035
Int. Cl. A61b 5/10
U.S. Cl. 128—2 S **7 Claims**



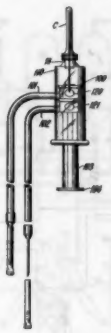
A shoe innersole having a laminated construction of an upper leather-like layer, a center layer formed of an open-cell polyurethane matrix filled with a combination of lattices so as to be plastically deformable, and a bottom layer of a resilient rubber material. The innersole deforms in conformance with the impression of a wearer's foot so as to concurrently soften the foot fall by supporting a larger area of the foot while providing a resilient cushioning effect. In another embodiment, the innersole incorporates an additional area which cups under and provides a minor amount of support to the arch region of the wearer's foot.

In addition, the innersole is used by an orthopedic physician to obtain a record of the actual pressure exerted by a foot in a shoe for the purpose of prescribing or diagnosing the foot problems of a patient.

3,730,170
APPARATUS FOR DISTRIBUTING A SAMPLE OF BLOOD TO A PLURALITY OF CULTURES

Thomas M. Michael, 8 Carol Ann Road, Lynnfield, Mass.

Filed April 29, 1971, Ser. No. 138,519
Int. Cl. A61b 5/14
U.S. Cl. 128—2 F **7 Claims**

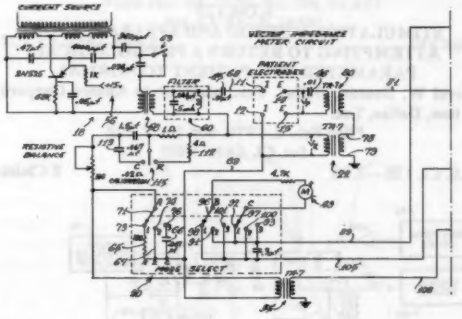


An apparatus for distributing a sample of blood contained in a syringe or blood collecting tube comprises a distribution housing which is divided into at least two chambers, and which includes conduit means extending from each chamber to blood culture bottles. The needle of the blood collecting tube passes through puncturable sealing means formed in the distribution housing and the partition between the chambers of said housing to enable the selective distribution of blood to the respective blood culture bottles.

3,730,171
IMPEDANCE RELATED BLOOD FLOW MEASURING DEVICE

Richard Namon, P. O. Box 822, Coral Gables, Fla.

Continuation of Ser. No. 818,307, April 22, 1969, abandoned. This application Sept. 23, 1971, Ser. No. 183,217
Int. Cl. A61l 5/00
U.S. Cl. 128—2.05 Z **21 Claims**

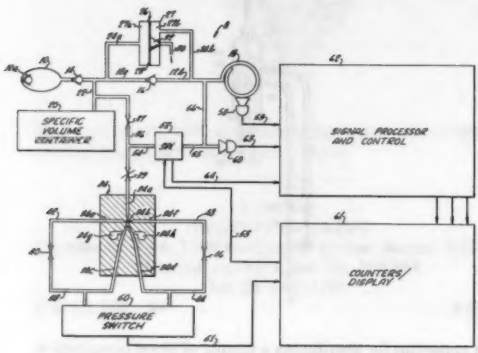


A cardiac blood flow measuring method and apparatus including two current electrodes and two voltage pick-up electrodes positionable in direct contact with the subject, with a circuit for applying a high frequency, low voltage current to the current electrodes and a circuit for measuring the total impedance across the voltage pick-up electrodes by using a summing circuit for adding selectively either a resistive or a reactive voltage to the subject's total impedance voltage to determine selectively either the subject's resistive impedance or reactive impedance with the reactive impedance being employed to measure cardiac blood volume flow.

3,730,172
SPHYGMOMANOMETER

Charles L. Buddecke, Fullerton, and John Le Valley, South Pasadena, both of Calif., assignors to Accumed, Inc., Fullerton, Calif.

Filed Oct. 14, 1971, Ser. No. 189,425
Int. Cl. A61b 5/02
U.S. Cl. 128—2.05 M 31 Claims

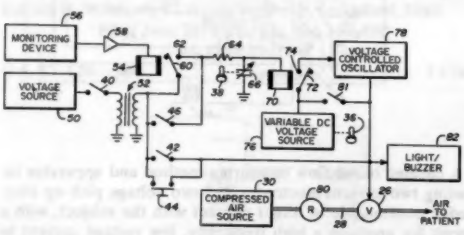


A container of specific volume is pressurized simultaneously with the inflation of an artery occluding cuff. The container is isolated from the cuff by means of a diaphragm, which after inflation of the cuff, controls bleeding of the cuff pressure in a manner to maintain cuff pressure equal to the container pressure. A fluidic bistable oscillator or flip-flop is connected to bleed fluid from the container through alternating exhaust paths in a manner to produce oscillating mass-flow pulses. The mass-flow pulses are counted as incremental and accumulating pressure values when signals are received from a microphone detecting Korotkoff noises. The counters provide a digital display of systolic and diastolic pressures. Pulse events are utilized to reinforce the detection of Korotkoff signals, and the pulse rate per minute is recorded in a separate register.

3,730,173
STIMULATION METHOD AND APPARATUS FOR ATTEMPTING TO RETURN A PHYSIOLOGICAL PARAMETER OF A PATIENT TO NORMAL

David W. Deaton, Dallas, Tex., assignor to Ahlden Corporation, Dallas, Tex.

Filed Feb. 2, 1970, Ser. No. 7,792
Int. Cl. A61b 5/00
U.S. Cl. 128—2.08 8 Claims

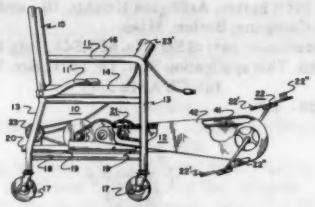


A selected physiological parameter of a patient, such as the respiration or heart beat of the patient, is monitored. When certain variations in the monitored parameter are detected, a stream of pressurized fluid, such as air, is directed against the patient's body to provide cutaneous stimulation in an effort to return the monitored parameter to normal.

3,730,174
EXERCISER FOR PARAPLEGIC PATIENTS

George L. Madison, Route 2, Weiser, Idaho

Filed Nov. 19, 1971, Ser. No. 203,097
Int. Cl. A61h 1/02
U.S. Cl. 128—25 R 1 Claim

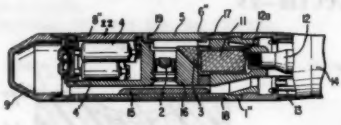


An exercising chair having a plurality of suitable legs, a pair of arms, a seat, and a back; a frame including a pair of rectilinear bars fastened at each side of the chair to the legs distally below the chair seat, a pair of transverse bars disposed distally from one another and fastened to the rectilinear bars, and a centrally disposed beam fastened to the transverse bars, the beam running under the chair seat and projecting distally forwardly of the chair; a drive train including an electric motor fastened to the beam, a suitable control means operable to selectively control the motor, and gears and drive means operable to reduce speed of output rotation of the motor and to reduce the load on the motor; and a pair of pedals driven by the drive train, the pedals being disposed on the forwardmost terminal end of the beam.

3,730,175
ENDOSCOPE

Masaharu Fukami, Tokyo, and Takeshi Okada, Hachioji-shi, Tokyo, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 869,070, Oct. 24, 1969, abandoned. This application March 24, 1971, Ser. No. 127,536
Int. Cl. A61b 1/06
U.S. Cl. 128—6 7 Claims



Endoscope having a distal end portion connected through an elongated tube to a control housing so as to be inserted into a hollow portion of a living body for the inspection thereof. The distal end portion is provided with at least a light transmitting window such as a photographing or viewing window through which the light from an object is introduced into the distal end portion so that an image of the object is formed by an objective lens therein so as to be photographed or viewed. A plastic layer is fluidtightly provided on at least the area including the photographing or viewing window by the heat shrinkage or injection moulding of the plastic layer and an opening is formed in the plastic layer, the radially inwardly offset peripheral edge portion of which is snugly fitted in the light transmitting window, while a shoulder portion is formed in the inside of the inwardly offset peripheral edge portion along therewith. A transparent plate such as a glass plate is fitted in the shoulder portion with its peripheral edge portion firmly bonded to the shoulder portion. Alternatively, the plastic layer is made of a transparent material and the portion of the layer covering the photographing or viewing window is

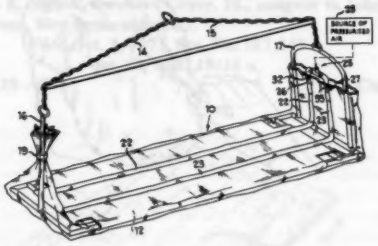
thickened so as to firmly fit in the window thereby providing a fluidtight transparent window.

3,730,176

DEVICE FOR PREVENTING CONTAMINATION IN HYDROTHERAPY TREATMENT SYSTEM

Robert C. Miller, Elgin, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 28, 1971, Ser. No. 213,142
Int. Cl. A61h 9/00
U.S. Cl. 128—66 **8 Claims**



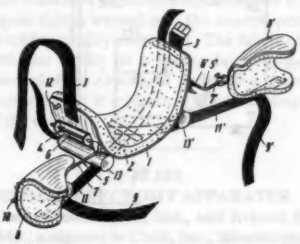
A hoist-controlled litter or plinth, which supports a patient partially immersed in agitated water in a hydrotherapy tank, is covered with a disposable flexible, water-tight sleeve, made of plastic film, in order to completely isolate the litter from any contact with the water. The water-tight barrier established by the sleeve prevents the transmission of bacteria between the litter and the water in the tank and this in turn prevents the various patients using the litter from cross-infecting each other. Apertured conduits or air tubes may be attached to or integrally formed in the flexible plastic sleeve to facilitate the injection of pressurized air into the water to effect the required water agitation. The particular locations of the openings in the air tubes may be customized to the specific needs of each patient, thereby providing agitation only adjacent those localized areas of the patient's body necessitating hydrotherapy treatment.

3,730,177

SPREADING BANDAGE FOR CHILDREN HAVING DISLOCATED HIP BONES

Oskar Thum, Fibiger Str. 81, Hamburg, Germany

Filed June 2, 1971, Ser. No. 149,282
Int. Cl. A61f 3/00
U.S. Cl. 128—80 A **10 Claims**



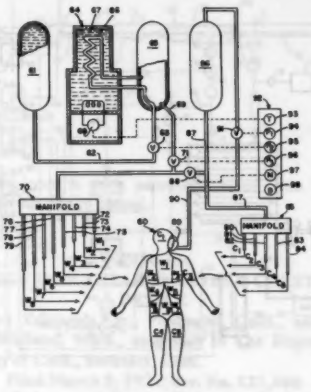
A spreading bandage for patients, especially children, having dislocated hip bones. A rigid U-shaped supporting member is fastened to the back of the patient and has a pair of pivotable thigh supporting members mounted thereon. The thigh supporting members are disposed perpendicular to the body supporting member, and are forced apart outwardly by tension belts or springs mounted thereon. The force exerted by the springs and belts maintain the thighs of the patient in a spread-apart position to cause proper relocation of the hip bones in the body of the patient.

3,730,178

DEEP-SEA DIVE SUIT AND LIFE SUPPORT SYSTEM

Fred E. Moreland, 726 W. Lexington Avenue, Elkhart, Ind.

Division of Ser. No. 22,266, March 24, 1970, Pat. No. 3,648,289. This application Sept. 22, 1971, Ser. No. 182,609
Int. Cl. A62b 7/00
U.S. Cl. 128—142.5 **1 Claim**



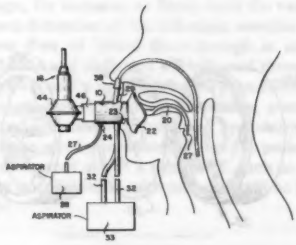
Present invention relates to a deep-sea dive suit and self contained underwater breathing and heating apparatus therefor. The improved suit is laminated in six layers which form a passageway for the circulation of an oxygen-gas mixture that transmits heat from the warmer parts of the body to its extremities. The oxygen-gas mixture is generated from a supply of a cryogenic oxygen containing liquid stored in a back pack reservoir. The cryogenic liquid is heated, converted to a gas, circulated through the suit and finally conditioned for breathing by the diver.

3,730,179

COMBINATION RESUSCITATING, ASPIRATING AND GASTRIC DRAINING APPARATUS

Arthur G. Williams, 516 19th Ave., N.E., Saint Petersburgh, Fla.

Filed Oct. 30, 1970, Ser. No. 85,433
Int. Cl. A61m 16/00
U.S. Cl. 128—145.5 **10 Claims**



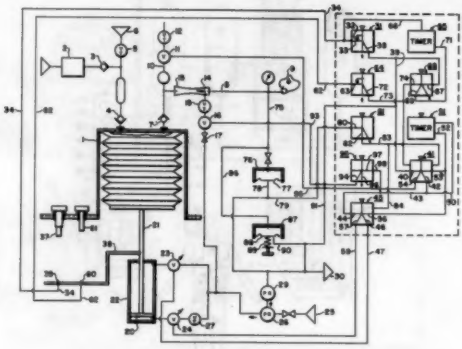
This invention is a combination resuscitating, aspirating and gastric draining apparatus of unitary construction which includes a tubular body, a portion of which is adapted for insertion into the mouth. A resuscitating supply source is detachably engaged with the tubular body. Nasal pharyngeal catheter tubes extend transversely through the tubular body for insertion into the nostrils for gastric draining. An oropharyngeal catheter tube extends longitudinally through the tubular body, for insertion down the throat. An aspirating source is operatively engaged with the nasal pharyngeal and oropharyngeal tubes.

3,730,180

PNEUMATICALLY OPERATED VENTILATOR

Ellison L. Davison, Gibsonia, Pa., assignor to Mine Safety Appliances Company, Pittsburgh, Pa.

Filed Oct. 21, 1970, Ser. No. 82,755
Int. Cl. A61m *16/00*
U.S. Cl. 128—145.6 **8 Claims**



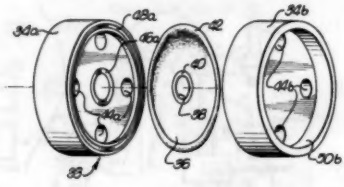
A pneumatically operated pump is connected with a conduit for supplying a gas to a patient's lungs. A first fluidic control element and a pneumatic timer control means for delivering air under pressure to the pump for operating it. The fluidic control element is controlled by a second fluidic control element, which in turn is controlled by a third fluidic control element. The latter is controlled by the movement of the pump during lung inflation to reverse the pump in order to allow exhalation. The second control element also controls an exhalation valve. Other elements provide for periodic longer inhalation periods, excess pressure release and sudden inhalation.

3,730,181

DIAPHRAGM EAR VALVE

John J. Fling, Malibu, Calif., assignor to Sigma Engineering Company, North Hollywood, Calif.

Continuation-in-part of Ser. No. 858,600, Sept. 17, 1969, abandoned. This application March 10, 1971, Ser. No. 122,856
Int. Cl. A61t *11/02*
U.S. Cl. 128—152 **6 Claims**



A diaphragm ear valve for protection of the ear drum from the injurious percussive and repercussive overpressures of strong sound waves.

The ear valve or sound transmitter comprises a flexible diaphragm means which has a sound passage aperture therethrough. The diaphragm means is stretched radially outwardly and held by two catcher plate means each having a sound passage therethrough and annular holding means to retain the outer annular diaphragm bead. The apertures affording a sound path of sinuous configuration.

The ear valve is adapted to receive an ear canal fitting.

3,730,182

METHOD OF DELIVERY OF SOLUTION TO SKIN HAVING SUBSTANTIAL AMOUNTS OF HAIR THEREON

Malcolm P. Boghosian, Long Beach, Calif., assignor to Allergan Pharmaceuticals, Santa Ana, Calif.

Continuation-in-part of Ser. No. 781,781, Dec. 6, 1968, abandoned. This application March 19, 1971, Ser. No. 126,340
Int. Cl. A61m *11/00*
U.S. Cl. 128—173 **10 Claims**

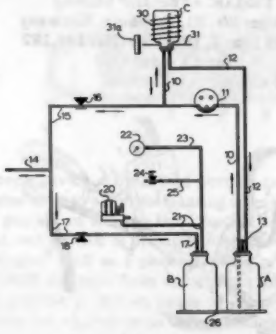
A method for delivery of medicaments to human or animal skin having substantial amounts of hair growing therefrom, for example, the scalp, comprising the steps of transporting the medicaments in a volatile carrier solution to a position closely adjacent to the skin without wetting the hair with the preparation, and atomizing the preparation at said position onto the skin to thereby uniformly distribute the preparation over the scalp thereby improving absorption of the medicament through the skin without significant interference by the hair.

3,730,183

PERITONEAL DIALYSIS APPARATUS

Henry John Goldsmith, and Frank Kirk, both of Liverpool, England, assignors to Whiteley Lang and Neill Limited, Liverpool, England

Filed July 1, 1970, Ser. No. 51,494
Int. Cl. A61m *05/00, 01/00*
U.S. Cl. 128—213 **7 Claims**



The invention is concerned with apparatus for use in the treatment of acute and chronic renal failure by peritoneal dialysis and provides Dialysis apparatus comprising a bulk supply container for dialysate, a bulk waste container, an adjustable head gravity feed container provided with controlled heating means, a fluid flow line between said gravity feed container and said bulk supply and waste containers, a pump for pumping dialysate from the bulk supply container to the gravity feed container, means for determining the amount of dialysate pumped to the gravity feed container, a fluid flow line from

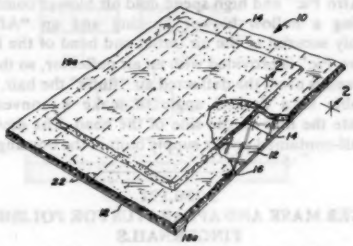
the gravity feed container for association with a cannula placed in a patient, a fluid flow line for association with said cannula and leading to the bulk waste container, a vacuum pump and control means for reducing the pressure in the bulk waste container thereby to assist the outflow of dialysate from a patient to said container, weighing means for the bulk supply and bulk waste container, and an electro-magnetic control circuit which provides for the automatic control of the apparatus.

3,730,184

DISPOSABLE DIAPER

Frederick K. Mesek, Downers Grove, Ill., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed Oct. 7, 1971, Ser. No. 187,249
Int. Cl. A61f *13/16*
U.S. Cl. 128—287 **7 Claims**



A non-woven fabric is disclosed which comprises a highly water absorbent web of mixed long and short fibers that is through bonded throughout its dimensions with a binder (adhesive) to retain the fibers in their assembled relationship. In the final set stage of the binder it is hydrophobic in character and hence the resulting fabric is rendered more or less water repellent. In this invention the mid-portion of the bonded fabric is treated with a wetting agent (surfactant) to minimize the water-repellent effect of the binder and to make the mid-portion of the fabric readily wettable. The marginal side edges of the bonded fabric are not treated with a wetting agent, so that these portions of the fabric throughout their dimensions are more or less water repellent. By this is meant that the marginal side portions of the bonded fabric are difficultly wettable as compared to the mid-portion of the fabric. As indicated, the binder material at the side edges of the fabric is present throughout the thickness of the fabric, and hence it is effective to prevent liquid that is wetted into the central portion of the fabric from wicking readily outwardly. The fabric of the invention has particular utility as a facing layer in a disposable diaper that includes an absorbent pad and a water-repellent backing member, since it minimizes liquid leakage from the side edges of the diaper.

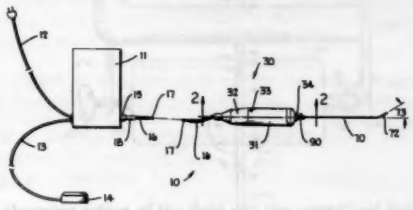
3,730,185

ENDARTERECTOMY APPARATUS

William A. Cook, Bloomington, Ind., and Everett R. Lerwick, St. Louis, Mo., assignors to Cook, Inc., Bloomington, Ind.

Division of Ser. No. 87,902, Nov. 9, 1970. This application Oct. 29, 1971, Ser. No. 193,731
Int. Cl. A61b *17/22*
U.S. Cl. 128—303 **3 Claims**

An apparatus and method for removing arteriosclerotic material from an artery. An electric motor is connected by flexible springs or torque shaft to a rotation oscillation converter. A rod having a bendable looped tip or loop at its distal end is removably connected to the oscillatory output of the converter. The loop or tip is inserted into the artery which has been cut to receive the tip. The tip is oscillated between the media layer and advantitia layer stretching the adventitia layer and causing separation of the two layers. The loosened ar-



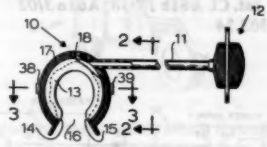
teriosclerotic core is then removed intact from the artery which is then surgically closed.

3,730,186

ADJUSTABLE IMPLANTABLE ARTERY-CONSTRICTING DEVICE

Louis Henry Edmunds, Jr., Piedmont, Calif., and Silas A. Braley, Midland, Mich., assignors to The Regents of The University of Calif., Berkeley, Calif.

Filed March 5, 1971, Ser. No. 121,406
Int. Cl. A61b *17/12*
U.S. Cl. 128—325 **6 Claims**



A device, completely implantable within the human body, for restricting the flow of blood through a major blood vessel, such as an artery, especially the pulmonary artery. An inflatable, flexible annulus, generally circular in shape but not a closed circle, has a non-distensible outer wall so that upon inflation all distention or expansion is inward. The device is placed around an artery or other blood vessel, and the ring may then be closed, as by suturing together preformed tabs attached to the annulus, or by suturing together the ends of an overlapping tape, for instance, to firmly hold the vessel. Upon inflation, inward distention of the inflatable annulus constricts the vessel, and flow of blood therethrough is accordingly restricted. Inflation and deflation are effected through a self-sealing hollow bulb and a non-distensible tube connecting the bulb to the interior of the inflatable annulus, pressure fluid being introduced into the bulb by a fine hypodermic needle. The device may be wholly contained within the patient's body, and all surfaces thereof are of a substance, such as a medical elastomer, that is compatible with and resistant to the action of body fluids.

3,730,187

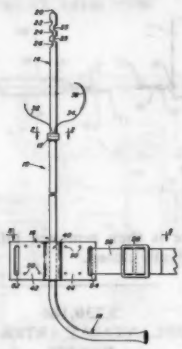
SEW-IN URETHRAL CATHETER

Verne J. Reynolds, 148 E. Jefferson, Boise, Idaho

Filed Jan. 22, 1971, Ser. No. 108,762
Int. Cl. A61m *25/02*
U.S. Cl. 128—349 R **17 Claims**

A securing means for a drainage catheter is disclosed, comprising a securing collar on the catheter, a fixation material being embedded in the collar for use in attaching the catheter firmly and without slippage to a patient. The fixation material may be a suture and needle, a wire clasp, or the like, the fixation material, collar and catheter forming a unitary, ready-to-

use device. The catheter also carries a fixation band spaced from the securing collar, the band being attached to the



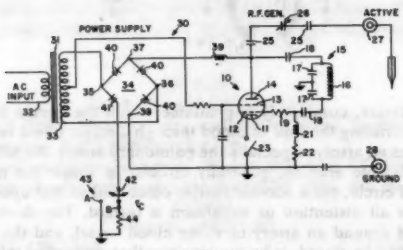
catheter to provide further anchoring means for securing the catheter.

3,730,188

ELECTROSURGICAL APPARATUS FOR DENTAL USE

Irving A. Ellman, 558 Willow Avenue, Cedarhurst, N.Y.

Filed March 24, 1971, Ser. No. 127,727
Int. Cl. A61b *17/38*; A61n *3/02*
U.S. Cl. 128—303.14 **9 Claims**



Electrosurgical apparatus for dental use employing an electronic radio-frequency oscillator is described. The radio-frequency oscillator or R.F. generator is powered by an electronic power supply constructed to selectively deliver full-wave rectified voltage and current for excellent cutting with minimal hemostasis, half-wave rectified voltage and current providing moderate cutting with maximum hemostasis, and voltage and current between the full-wave rectified and half-wave rectified condition for combined good cutting and good hemostasis. A further variation makes selectively available filtered or unfiltered rectified voltage and current for further control over cutting and hemostasis.

3,730,189

TOBACCO PRODUCT

Wilmer A. Rhode, Lake City, Fla., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Jan. 4, 1972, Ser. No. 215,398
Int. Cl. A24b *15/00*
U.S. Cl. 131—17 R **3 Claims**

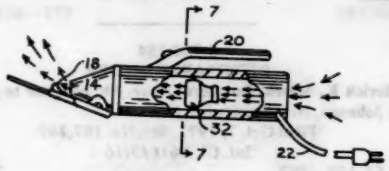
Addition of 2-hydroxy-3,5,5-trimethyl-2 cyclohexen-1,4-dione to tobacco in quanties of 0.0005 to 0.1 percent by weight for improving the flavor and aroma thereof.

3,730,190

AFRO PIC AND HIGH SPEED COLD AIR BLOWER COMBINATION

John E. Ford, 134-49 166th Place, Bldg. 19C, Apt. 132, Jamaica, N.Y.

Filed Dec. 2, 1971, Ser. No. 204,156
Int. Cl. A45d *24/00*
U.S. Cl. 132—11 **5 Claims**



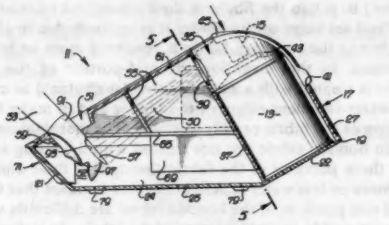
An "Afro Pic" and high speed cold air blower combination comprising a hollow blower housing and an "Afro Pic" detachably secured to the air outlet end head of the housing. The "Afro Pic" is provided with an air deflector, so that while the pic itself is used, the deflected air "fluffs" the hair. The pic is rotatable to a desired angle to make it convenient to manipulate the hair on the side of the head. The device may have a self-contained power supply built in the housing.

3,730,191

FINGER MASK AND APPARATUS FOR POLISHING FINGERNAILS

William A. Doornbos, Fountain Valley, Calif., assignor to Richard W. Beall, Jr., Torrance, Calif., a part interest

Filed July 27, 1971, Ser. No. 166,344
Int. Cl. A45d *29/05*
U.S. Cl. 132—73.6 **11 Claims**



A housing defines a chamber in which the tip of a finger may be positioned and a compartment for holding an aerosol can. Structure is included defining a nail polish delivery path for confining nail polish sprayed from an aerosol can mounted in the compartment, thereby to direct sprayed nail polish to the chamber to spray a fingernail positioned therein. A dryer is mounted in the housing for drying sprayed fingernails and a mask made of an elastic flexible material is provided for stretching around and masking a finger tip from sprayed nail polish while exposing the fingernail.

3,730,192

METHOD FOR INHIBITING STAINING OF ELECTRODEPOSITED COATINGS FORMED IN A CYANIDE CONTAINING BATH

Lloyd O. Gilbert, 824 E. Central Pk., Davenport, Iowa, and John S. Finney, 1441 Bennett, Warson Woods, Mo.

Filed Jan. 25, 1971, Ser. No. 109,658
Int. Cl. C23b *1/24*; C23g *1/26*
U.S. Cl. 134—2 **7 Claims**

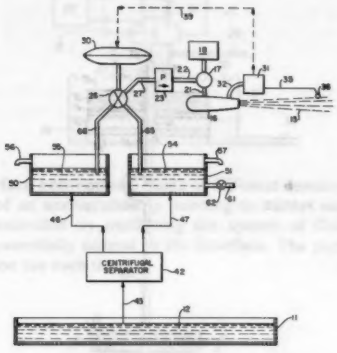
A method for inhibiting the staining of electrodeposited coatings which have been formed in a cyanide containing bath comprising the contacting of the coated objects with an aqueous solution of an aldose sugar.

3,730,193

METHOD AND APPARATUS FOR PREVENTING ELECTROSTATIC FIELDS IN LARGE TANKS

Fontaine C. Armistead, Darien, Conn., assignor to Texaco Development Corporation, New York, N.Y.

Filed April 12, 1971, Ser. No. 133,064
Int. Cl. B08b *3/02, 9/08*
U.S. Cl. 134—10 **13 Claims**



In mammoth oil tanker cleaning operations, a procedure and apparatus to control and prevent formation of electrostatic charges in a tank. There is an electrostatic voltmeter to measure the field near the nozzle of a cleaning jet. The jet fluid is made up of a mixture of clean sea water with oily water, and the relative amount of each fluid in the mixture is controlled so as to produce a spray that has a neutral charge.

3,730,194

METHODS OF AND COMPOSITIONS FOR STRIPPING RUBBER ARTICLES ADHERED TO A SUBSTRATE

Marshall M. Shoner, 12244 S. Truro, Hawthorne, Calif.

Continuation-in-part of Ser. No. 791,787, Jan. 16, 1969, abandoned. This application Jan. 24, 1972, Ser. No. 220,481
Int. Cl. C11d *7/50, 7/08;* **B08b** *3/08*
U.S. Cl. 134—41 **8 Claims**

Rubber articles adhered to a metal or plastic object by a commercial bonding agent can be removed by immersion in stripping solutions. For nitrile rubber articles, the solution consists of between 15 ml and 20 ml of hydrofluoric acid and between 150 ml and 170 ml of nitric acid in a gallon of acetone. For silicone rubber articles, the solution consists of hydrofluoric acid, sulfuric acid, in a ratio of 6:5, in acetone with a total of from 45 ml to 65 ml of combined HF and H_2SO_4 for each gallon of acetone. These solutions attack the bond between the rubber and bonding agent. Effective stripping is achieved by immersing the object in the solution at room temperature for a few hours or less. The solutions will not damage an anodized surface.

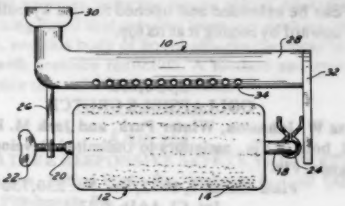
3,730,195

APPARATUS FOR CLEANING PAINT ROLLER COVERS

Robert De Witt Kay, 4893 Purdy Lane, West Palm Beach, Fla.

Filed April 15, 1971, Ser. No. 136,278
Int. Cl. B08b *3/02*
U.S. Cl. 134—138 **2 Claims**

An apparatus and method for cleaning a paint roller cover in which a paint thinning fluid spray is directed at an angle to the paint roller and roller cover surface causing them to rotate. Paint residue on the roller cover surface is removed by



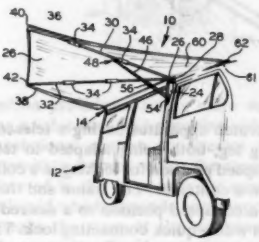
the cleansing action of the fluid and the centrifugal force on the roller surface.

3,730,196

STORABLE VEHICLE CANOPY

Charles L. Borskey, P.O Box 26, Andrews, Ind.

Filed July 16, 1971, Ser. No. 163,278
Int. Cl. E04f *10/06*
U.S. Cl. 135—5 A **6 Claims**



A canopy structure for a vehicle which is readily storable on the vehicle and may be readily removed from its stored position to a position of use.

3,730,197

BAG WITH COLLAPSIBLE UMBRELLA

Helen P. Lunney, Brooklyn, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Feb. 14, 1972, Ser. No. 225,868
Int. Cl. A45b *25/24*
U.S. Cl. 135—16 **1 Claim**

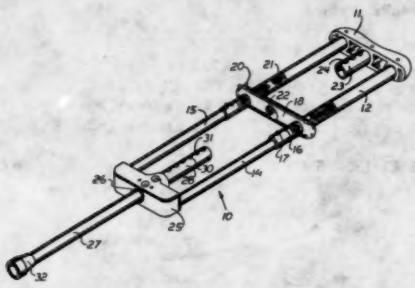
A shopping bag having a handle and adapted to be carried with or without use of the handle contains detachably an in-

verted collapsible telescopic umbrella. The handle of the umbrella is detachably held at the bottom of the bag and the umbrella can be extended and opened for use by pulling the umbrella upward by seizing it at its top.

3,730,198
COLLAPSIBLE CRUTCH

Thomas W. Johnston, Winter Park, and Jack M. Pippin, Sanford, both of Fla., assignors to Unlimited Development, Inc., Orlando, Fla.

Filed March 1, 1972, Ser. No. 230,730
Int. Cl. A61h *3/02*
U.S. Cl. 135—50 **8 Claims**

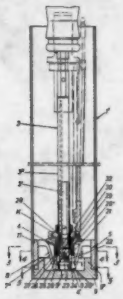


A collapsible crutch apparatus having a telescoping frame and a telescoping leg, both being adapted to telescope the crutch into a collapsed position for locking in a collapsed position for storage in a container. The frame and the leg can be telescoped from a collapsed position to a desired length and locked in position with a quick connecting lock. The dual collapsing system allows the crutch to be transported and stored in a relatively small storage container and then to be quickly expanded for use.

3,730,199
UMBRELLA AND SHEATH

Klaus Thur, Solingen, Germany, assignor to Telesco Brophey Limited, East Montreal, Quebec, Canada

Filed Feb. 11, 1972, Ser. No. 225,555
Claims priority, application Germany, Oct. 13, 1971, P 21 50 937.5
Int. Cl. A45b *25/00*
U.S. Cl. 135—20 R **4 Claims**



A collapsible umbrella in combination with a rigid wall sheath, a resilient clip within the sheath adapted to grip the cap of the umbrella when the umbrella is collapsed and in the sheath, the cap includes a split annular flexible head for engagement with the clip and the sheath and a movable core is provided within the cap for engagement in the head. The core is movable from a position within the head upon a full extension of the telescopic stick, thereby releasing the head from engagement with the resilient clip within the sheath.

3,730,200
GAS VENT

Ronald G. Deeks, Oakville, Ontario, Canada, assignor to Procor Limited, Chicago, Ill.

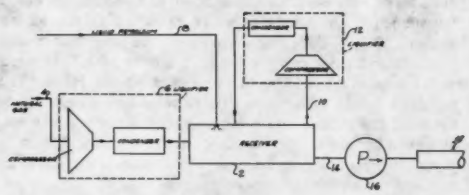
Filed April 1, 1971, Ser. No. 130,423
Int. Cl. F16l *53/00*
U.S. Cl. 137—1 **2 Claims**

A method and apparatus for venting hydrogen sulphide gas from a vessel or tank car containing hot molten sulphur therein, wherein a layer of sulphur crust has formed on the upper surface thereof and conventional venting arrangements are non-functional due to blocking by solidified sulphur. A hot fluid is passed through a conduit so as to melt a hole in the sulphur crust around the outer periphery of the conduit and thus permit trapped hydrogen sulphide gas from the area below the crust to pass upward therethrough. The hydrogen sulphide gas is then vented from the area above the crust to the outside of the vessel.

3,730,201
TRANSMISSION OF MIXED PETROLEUM PRODUCTS THROUGH A FROZEN MEDIUM

Kenneth W. Lefever, Waterford, Va.

Filed March 16, 1971, Ser. No. 124,987
Int. Cl. F17d *1/16*
U.S. Cl. 137—13 **4 Claims**

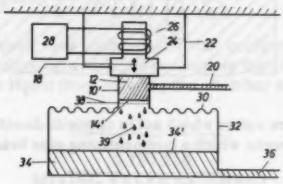


A method of transmitting a petroleum product through a frozen medium which is structurally unstable at temperatures at or above freezing. A fluid which is normally gaseous at ambient temperatures is liquified and mixed with the petroleum product to be transmitted. The mixture is then transmitted through a pipeline supported by the frozen medium and the fluid is maintained in a liquid state throughout the length of the pipeline.

3,730,202
METHOD OF CONTROLLING AN INTERFACE BETWEEN TWO FLUIDS

Gerhard H. Wolf, 23 Ungererstr. 248, Munich, Germany

Filed Aug. 31, 1970, Ser. No. 68,231
Claims priority, application Germany, Nov. 12, 1969, P 19 56 938.1
Int. Cl. F17d *1/16*
U.S. Cl. 137—13 **10 Claims**



An interface between two fluids of different densities in the presence of an acceleration, g, tending to distort said interface, is controlled by oscillating the system of fluids in a direction essentially normal to the interface. The parameters of oscillation are such that

$$\frac{b_m}{g} \geqq -\frac{\sqrt{8}\,\pi f}{\Omega_0}$$

wherein

b_m is the maximum acceleration of the interface due to the oscillation

f is the oscillation frequency

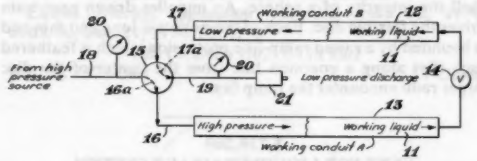
Ω_0 is the slowest eigenmode of the system of fluids.

The interface may be a lower surface of a body of liquid, the other fluid being a gas, and the parameters of the oscillation may be controlled such that rain-like droplets are expelled from the otherwise stabilized surface.

3,730,203
REDUCING PRESSURE ON LIQUIDS

Melvin F. Katzer, Danville, and Willis G. Routson, Walnut Creek, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 869,531, Oct. 27, 1969, abandoned. This application Oct. 4, 1971, Ser. No. 186,478
Int. Cl. F17d *3/00*
U.S. Cl. 137—14 **11 Claims**

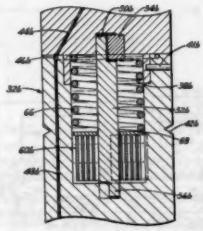


A liquid which is detrimentally affected by shear, or which cannot be flowed through conventional pressure reducing devices, is reversibly worked against a second body of liquid on which work is done to reduce the pressure on the first liquid. Illustratively, liquid on which pressure is to be reduced is alternately flowed into each of two working conduits in liquid communication at one end through a liquid pressure reducing means. As liquid is introduced into one working conduit, corresponding volumes of liquid are flowed through the pressure reducing means and removed from the second working conduit. The total amount of liquid introduced into a working conduit at one time, however, is approximately equal to or less than the volume of a working conduit. As a consequence, the pressure reducing means always operates on a body of working liquid that recycles from one working conduit to the other, and this body of liquid absorbs the shear stresses associated with pressure reduction. A method and apparatus for the practice thereof are each provided.

3,730,204
TEMPERATURE RESPONSIVE SAFETY VALVE STEMS

James S. Bissett, Bethel Park, Pa., assignor to Gulf Oil Corporation, Pittsburgh, Pa.

Filed Sept. 23, 1971, Ser. No. 183,136
Int. Cl. F16k *17/38*
U.S. Cl. 137—68 **13 Claims**

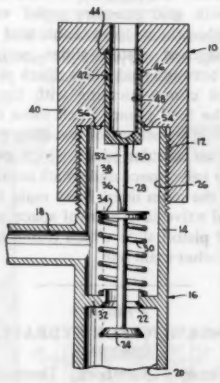


The invention provides a safety valve stem structure for valves having a valve stem and requiring either rotational motion or translational motion to operate the active valve member. A cavity is formed within the stem and a weakened portion is formed in the stem near the cavity. The cavity is filled with a liquid which expands upon exposure to excessive heat and breaks the stem at the weakened portion. After breakage, the expanding liquid, sometimes with a spring assist, closes the valve member.

3,730,205
FUSIBLE SAFETY DEVICE

Bobby E. Guimbellot, 312 Briar Grove, Gretna, La.

Filed Aug. 11, 1971, Ser. No. 170,866
Int. Cl. F16k *17/38*
U.S. Cl. 137—73 **7 Claims**



A fusible safety device for use with a spring-loaded safety valve having an elongated valve stem mounted on a shiftable valve plug. The safety device comprises a hollow body adapted to be mounted on the casing of the valve. A fusible plug is mounted within the hollow body in a position to contact the valve stem and maintain the valve plug in a port clearing position. The fusible plug has an internal cavity extending

longitudinally from one end thereof and terminating at a location spaced from the other end to present an end wall which contacts the valve stem. The fusible plug is constructed of a material which is capable of softening at an elevated temperature or in the presence of crude oil.

3,730,206

FLUSHING VALVE ARRANGEMENT FOR REVERSIBLE HYDROSTATIC GEAR MECHANISMS

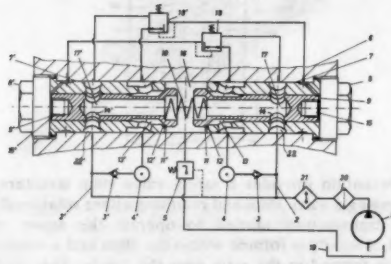
Tomas Sirek, Hausen, Germany, assignor to Constantin Rauch, Upm, Donau Listrasse, Germany

Filed Dec. 1, 1971, Ser. No. 203,522

Claims priority, application Germany, Dec. 17, 1970, P 20 62 308.9

Int. Cl. F16d *31/00*

U.S. Cl. 137—87 **5 Claims**



A flushing valve arrangement for reversible hydrostatic gear mechanisms with a closed circuit and a feed pump which communicates through non-return valves with each of two main lines of the circuit and with a pressure relief valve connected to a storage container. Its inlet can, through a flushing reciprocating valve and as a function of the pressure in the relevant high pressure line, communicate with whichever main line is carrying the low pressure. The flushing reciprocating valve comprises two coaxially and mirror-symmetrically disposed valve bodies enclosing a common valve space which communicates with said pressure relief valve, said valve bodies having within them displaceable and likewise mirror-symmetrically disposed piston slides reciprocally braced through a spring between said slides. Each piston slide has an inner valve space communicating with the common valve space and with the feed pump. Each valve body with its associated piston slide by means of a sealing piston face and a valve seat forms an annular space which can be closed off from the common valve space and which communicates at any time with one of the main lines. Each main line is connected through a control valve to a control space on the outer end face of the other piston slide which forms an annular space connected to the other main line.

3,730,207

VALVE ARRANGEMENT FOR HYDRAULIC STEERING SYSTEMS

Thorkild Christensen, Nordborg, Denmark, assignor to Danfoss AlS, Nordborg, Denmark

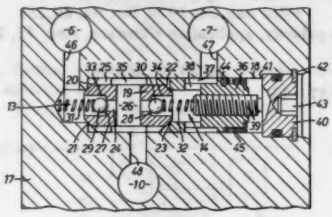
Filed Oct. 4, 1971, Ser. No. 186,104

Claims priority, application Germany, Oct. 2, 1970, P 20 48 421.3

Int. Cl. F15b *11/08*

U.S. Cl. 137—106 **6 Claims**

The invention relates to a valve arrangement for hydraulic steering systems in which the two pipes supplying a working motor are connected to a control means and to each other by way of a manually operable short-circuiting valve and two suction non-return valves which act in opposite directions to each other and between which a compensating pipe branches off.



3,730,208

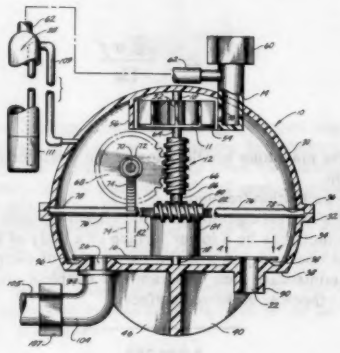
MULTIPLE OUTLET FLUID DISTRIBUTION APPARATUS

David E. Lewis, 509 Olympia Way, Orange, Calif.

Filed April 29, 1971, Ser. No. 138,674

Int. Cl. F16k *11/02*

U.S. Cl. 137—119 **14 Claims**



A flexible disc-like valve member is rotatably mounted within a shell to selectively seal fluid outlets from the shell and to selectively open the outlets through an arc-shaped slot in the valve. The shell includes a hemispherical portion, a spherical zone section joining the hemispherical portion at the latter's equator, and a circular plate-like bottom closing the spherical zone. Radially extending reinforcing ribs extend out to the limits of the sphere from the bottom to give the entire shell the integrity of a sphere. An impeller driven gear train drives the flexible disc. Each of the outlets is long and thin and is bounded by a raised ramp-like protrusion which is feathered such that along a common line from the center of the disc larger radii encounter the ramp first.

3,730,209

VENT FOR LIQUID DRAINAGE SYSTEM

William J. Binard, and John F. Dye, both of Barrington, Ill., assignors to The Kendall Company, Boston, Mass.

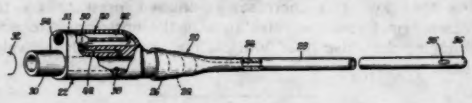
Filed June 2, 1971, Ser. No. 149,315

Int. Cl. F16k *45/00*

U.S. Cl. 137—217 **24 Claims**

A vent for a liquid drainage system having a drainage lumen, including an air chamber, a one-way valve connected to the chamber, and a passageway connected between the chamber and drainage lumen. The valve opens to permit the passage of air into the drainage lumen, and closes to prevent passage of fluid from the chamber. The liquid, which drains in the lumen past the passageway, refluxes into the passageway

responsive to a positive pressure condition in the lumen relative to the pressure in the chamber, and the refluxing liquid flow forces air from the passageway into the chamber to close the valve. Air is confined in the chamber by the closed valve,



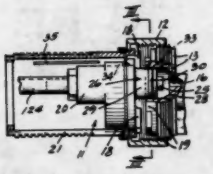
and the liquid flow compresses the confined air in the chamber to develop a resistive pressure in the chamber which prevents the liquid from entering the chamber and contacting the valve.

3,730,210

MIXING VALVE ASSEMBLY

Marvin E. Heyne, Anoka, Minn., assignor to The Cornelius Company, Anoka, Minn.

Filed Nov. 16, 1971, Ser. No. 199,164
Int. Cl. F16k *19/00*
U.S. Cl. 137—329.1 7 Claims



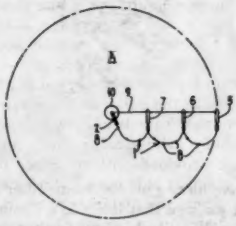
A mixing valve assembly includes a mounting sleeve, a first valve body with a pair of fluid passages leading to a single spout under the control of a single actuator, the first valve body being keyed to the mounting sleeve and held thereon by a threaded locking ring, and a second valve body with a pair of fluid passages each having a self-closing valve normally held open by the first valve body, there being telescopic fluid connections that are slidably detachable that form part of said valve bodies whereby the first valve body may be quickly demounted for service without use of tooling.

3,730,211

SPRINKLER IRRIGATION SYSTEMS

Robert James de Laine, 1 Montrose Court, Murrumbeena, and William Richard Clifford Geary, Flat 4, 18 Kensington Road, South Yarra, Victoria, both of Australia

Filed April 21, 1971, Ser. No. 135,863
Claims priority, application Australia, April 22, 1970, 0982/70; Dec. 21, 1970, 3551/70
Int. Cl. B05b *9/02*; E01h *3/02*
U.S. Cl. 137—344 12 Claims



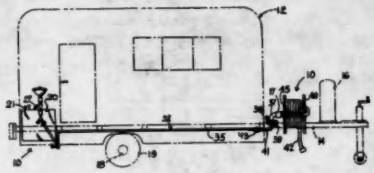
This specification discloses a sprinkler irrigation system comprising a sprayline swivelly secured to a central water hydrant, a plurality of hydraulic towing devices connected to said sprayline and driven by the water therein, said towing devices being interconnected by a tie line swivelly secured to the hydrant and constraining the towing devices to more in a circular path. The outermost towing device controls the rate of movement of the whole system through control means connected to each intermediate towing device and operated by changes in the angular position of the tie line relative to the intermediate towing device.

3,730,212

TRAILER WATER FILLING SYSTEM

Leon E. Walch, 15660 Crescent Wood, East Detroit, Mich.

Filed May 24, 1971, Ser. No. 146,316
Int. Cl. B65h *75/40*
U.S. Cl. 137—355.12 1 Claim



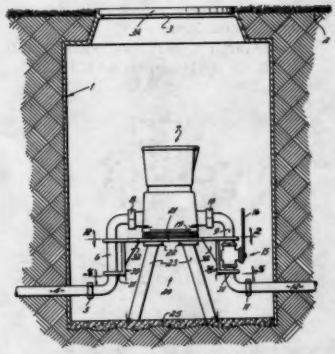
A trailer water filling system is disclosed for use with a trailer having a water storage tank for supplying fresh water and having a towing tongue by which said trailer is towed, said water filling system comprising first metal water piping constructed to be permanently fitted to said trailer and to extend thereon from the outlet of said water storage tank to the front of said trailer at the tongue thereof, support means constructed to be made fast to said tongue for supporting the front end of said first metal water piping hose reel assembly constructed to be removeable and portable in respect to said trailer and including second metal water piping rotatably supporting said hose reel, said second metal water piping supported at said tongue on said first metal water piping, and a rotating seal union joining the inner end of said second metal water piping and the outer end of said first metal water piping, and a flexible hose carried in coiled form on said reel having its inner end connected to the outer end of said second metal piping.

3,730,213

METER SETTER

Robert E. Bates, 3608 Placid Place East, Owensboro, Ky.

Filed May 22, 1972, Ser. No. 255,809
Int. Cl. F16l *55/00*
U.S. Cl. 137—364 7 Claims



A device for supporting and positioning a water meter to facilitate its connection in an underground water line. The device includes a meter platform supported on legs, and has

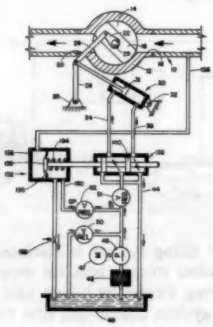
pipe positioning means at opposite sides of the platform for positioning vertical pipes to be connected to the inlet and outlet sides of the meter. The positioning means preferably include snap-in connections for the pipes, and permit each pipe to be shifted in a vertical direction to accommodate meters and installations of different dimensions.

3,730,214

ROTARY VALVE PRESSURE REGULATING SYSTEM

Richard S. Brumm, Orinda, Calif., assignor to Walworth Company, Bala Cynwyd, Pa.

Filed Sept. 24, 1971, Ser. No. 183,373
Int. Cl. F16k *31/12*
U.S. Cl. 137—487 **3 Claims**



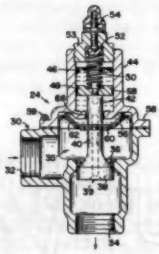
A pressure reducing regulating system including a rotatable control valve operated by a hydraulic cylinder. An infinite positioning four-way valve selectively connects opposite sides of the cylinder to a fluid source and is operated by a pressure-responsive member. The fluid pressure being controlled biases the pressure-responsive member against a fixed force, whereby the four-way valve is moved an amount proportionate to the extent to which the controlled pressure deviates from a predetermined level. The fixed force biasing the pressure-responsive member may be a fluid at a predetermined pressure, augmented by a spring force.

3,730,215

DIAPHRAGM CONTROLLED AIR RELIEF VALVE

William J. Conery, and Donald A. Kaessen, both of Ashland, Ohio, assignors to Hydr-O-Matic Pump Company, Hayesville, Ohio

Filed April 8, 1971, Ser. No. 132,422
Int. Cl. G05d *16/00*
U.S. Cl. 137—494 **3 Claims**



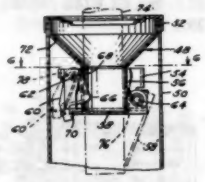
A valve for venting of air from the pumping chamber of a liquid pumping system. The valve assembly includes a valve casing having a through chamber with a valve seat and a valve head which is normally maintained on the downstream side of the valve seat in spaced relation therefrom and which is connected to a valve stem extending through the valve seat. A flexible diaphragm is attached to the valve stem on the upstream side of the valve seat. Under low pressure, low volume flow or no flow conditions the valve remains in open position. As the flow rate increases, increased pressure on the diaphragm forces the valve stem in the upstream direction, bringing the valve head into closing contact with the valve seat.

3,730,216

FUEL TANK INSERT FOR ADMITTING PRESELECTED PUMP NOZZLES

Lawrence E. Arnett, Wayne, and Paul J. Billock, Westland, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed April 6, 1972, Ser. No. 241,621
Int. Cl. F16k *45/00*
U.S. Cl. 137—588 **7 Claims**



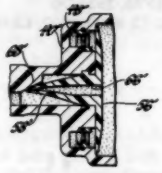
An insert to be positioned within the fuel tank inlet pipe of an automotive vehicle to prevent filling the tank with improper fuels. The insert would permit entry of and delivery from a pump nozzle spout of a predetermined diameter of less, to be used with non-leaded fuels and would preclude entry of and delivery from a larger diameter pump nozzle spout, to be used with leaded fuels. The insert includes a hinged gage having a latch which can be tripped by the smaller diameter nozzle but not by the larger diameter nozzle.

3,730,217

CHECK VALVE

Loren R. Gute, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed May 19, 1971, Ser. No. 144,893
Int. Cl. F16k *15/14*; F04b *21/02*
U.S. Cl. 137—512.4 **2 Claims**



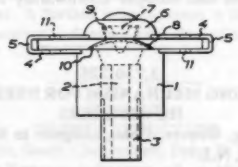
A check valve having an elastic member that provides sealing between a passage that leads to a chamber and a passage that leads from the chamber and further operates to provide check valve operation for directing flow from one of these passages to the chamber and also cooperates with additional check valve structure to direct flow from the chamber to the other passage.

3,730,218

NON-RETURN VALVES

Sverker Rydberg, Mantorp, Sweden, assignor to System Research Inc., New York, N.Y.

Filed June 26, 1970, Ser. No. 50,277
Claims priority, application France, July 2, 1969, 6922367
Int. Cl. F16k *15/14*
U.S. Cl. 137—525 **5 Claims**



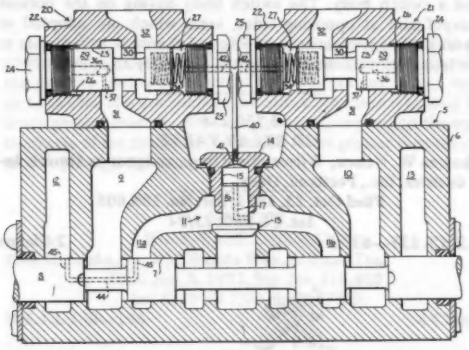
A non-return valve with closure means comprising two movable valve members, one of which is a diaphragm adapted to open rapidly at extremely slight pressures and to seal rapidly at back pressures, while the other valve member is a cover adapted to protect the diaphragm at relatively high back pressures in order to assure sealing engagement also at such conditions.

3,730,219

CONTROL VALVE MEANS FOR FLUID MOTORS

Francis H. Tennis, Oconomowoc, Wis., assignor to Hydraulic Industries, Inc., Hartland, Wis.

Filed May 20, 1971, Ser. No. 145,137
Int. Cl. F16k *11/00*
U.S. Cl. 137—596 **14 Claims**



A pressure reducing valve mechanism maintains pressure in one of the service passages of a control valve at a desirably low value except at times when the control valve element is actuated to a position effecting flow of pressurized supply fluid to said service passage for delivery to a motor governed by the control valve.

3,730,220

SELECTOR VALVES

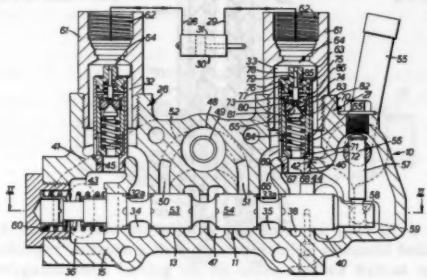
Kenneth Raymond Boydell, Bredons Hardwicke, Tewkesbury, England, assignor to Dowty Technical Developments Limited, Brockhampton, Cheltenham, England

Filed April 8, 1971, Ser. No. 132,479

Claims priority, application Great Britain, April 24, 1970, 19692/70

Int. Cl. F16k *31/36, 31/12, 17/26, 17/32*
U.S. Cl. 137—596.2 **10 Claims**

A selector valve has a service passage, the fluid flow through which from an inlet connection of the valve to a service-line connection thereof is controlled by a movable valve element, a service-line relief valve assembly being provided substantially wholly within, and arranged lengthwise of, said service passage by which that passage can be placed in communication with an exhaust port of the valve when the fluid pressure in the passage exceeds a predetermined value.

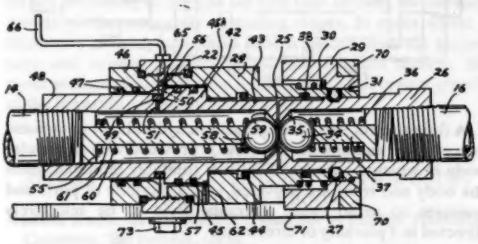


3,730,221

HYDRAULIC COUPLER WITH PRESSURE RELIEF MECHANISM

Albam M. Vik, New Brighton, Minn., assignor to Dempco, Inc., Minneapolis, Minn.

Filed July 9, 1971, Ser. No. 161,154
Int. Cl. F16l *29/00*
U.S. Cl. 137—614 **18 Claims**



A hydraulic coupler having two portions for hydraulic lines used, for example, in agricultural applications, which has an actuating device to open check valves to permit flow of fluid under pressure through said lines in response to pressure signals, for example a pressure signal in one line. The device also can be actuated to close the check valves to prevent flow through the coupler. The device is operable to permit the coupling or uncoupling of the two portions of the coupler without actuation against a high pressure.

3,730,222

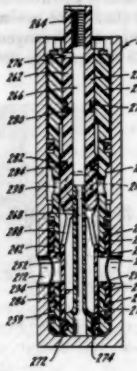
SINGLE LEVER MIXING VALVE

Alfred M. Moen, 25 Lakeview Drive, Grafton, Ohio

Filed May 27, 1971, Ser. No. 147,359
Int. Cl. F16k *11/02*
U.S. Cl. 137—625.17 **17 Claims**

A mixing valve for use in a faucet includes a sleeve which may be formed of plastic and a stem positioned within the sleeve and reciprocal and rotatable relative thereto. The sleeve has hot and cold water inlet ports and at least one outlet port. The stem has inlet and outlet openings such that movement of the stem is effective to control the volume and temperature of water discharged from the sleeve. The stem has an air passage connecting its opposite ends. There is a generally cylindrical seal enclosing the sleeve adjacent its inlet ports and

effective to form a seal between the exterior of the sleeve, the exterior of the stem within the sleeve and the interior of the



housing enclosing the stem and sleeve. The valve includes means for preventing water hammer.

3,730,223

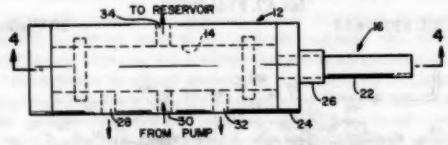
HIGH PRESSURE FLUID CONTROL VALVE

Robert L. Reece, Route 1, Box 130 East, Brentwood, Calif.

Filed June 1, 1971, Ser. No. 148,488

Int. Cl. F16k *11/00*

U.S. Cl. 137—625.23 **4 Claims**



A fluid control valve for operating a hydraulic or pneumatic ram or other equipment. The valve is provided with an annular body in which a cylindrical rotor is rotatably mounted. Both the body and rotor are provided with a plurality of ports and passages so as to cause hydraulic fluid to be selectively directed in a plurality of directions.

3,730,224

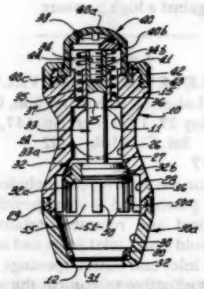
OUTLET VALVE FOR LIQUID SUPPLY RECEPTACLE

Orford W. Prisk, San Gabriel, Calif., assignor to Martin Weber, Alhambra, Calif.

Filed Dec. 23, 1970, Ser. No. 101,042

Int. Cl. F16k *1/32*; F15d *1/10*

U.S. Cl. 137—625.33 **8 Claims**



A valve assembly includes:

a. a valve body having a side inlet and a bottom outlet, there being a downwardly facing annular seat in the body through which fluid passes in flowing to the outlet,

b. a stopper upwardly engagable against the seat and a stem carrying the stopper and projecting upwardly in the body,

c. yieldable means urging the stem upwardly, and

d. a device sealing off over the body proximate the stem upper terminal and having a flexible upper portion exposed upwardly and projecting over the stem upper terminal, whereby said terminal may be depressed through said device to urge the stem and stopper downwardly for opening the valve.

3,730,225

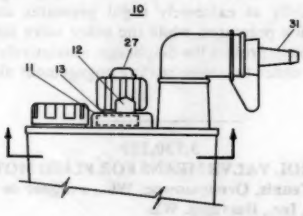
SWITCHING MECHANISM FOR NEBULIZER-HUMIDIFIERS

William R. King, Denver, Colo., assignor to Sandoz-Wander, Inc., Hanover, N.J.

Filed June 11, 1971, Ser. No. 152,352

Int. Cl. F16k *11/02*

U.S. Cl. 137—625.48 **2 Claims**



An improved switching mechanism for nebulizer-humidifier comprising in combination a switch button, a switch cover, and a switch body. The switch body having on the bottom thereof and at opposing sides, seals which are adopted to cover alternatively mist or bubble gas channels, in response to the lateral movement of the switch button by an operator.

3,730,226

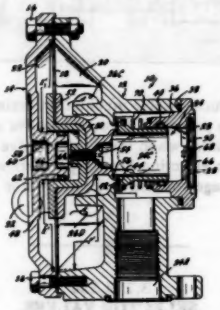
AIR RELAY VALVE

Thomas W. Nelson, Wilsonville, Oreg., assignor to Omark Industries, Inc., Portland, Oreg.

Filed Oct. 13, 1971, Ser. No. 188,806

Int. Cl. B60t *13/24*

U.S. Cl. 137—627.5 **2 Claims**



An air relay valve including an enclosed housing separated into an air supply chamber and a control chamber by a flexible diaphragm Air pressure introduced into the control chamber flexes the diaphragm into the air supply chamber. This opens the air supply chamber to an air pressure source with ports directing the air pressure from the air supply chamber into air lines that activate, e.g., air brakes. The relay valve is further

designed whereby the inlet from the air pressure source is kept open until the pressure on both sides of the diaphragm are equalized causing return of the diaphragm and automatic closing of the air pressure source. The present invention is characterized in providing a diaphragm wherein the two sides have equal surface areas exposed to the air pressure so that automatic shut off occurs at the point when the p.s.i. of the air in the air lines substantially equals the p.s.i. of the air in the control chamber with exhausting of the air pressure occurring through an exhaust port in direct communication with the air supply chamber. A further improvement is the inclusion of a dampening chamber to dampen vibration of the diaphragm assembly.

3,730,227

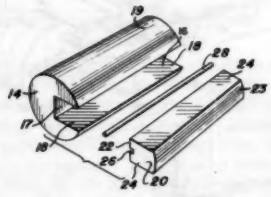
ORIFICE STRUCTURE

John A. Roberts, North Chelmsford; Peter R. Roberts, Groton, and Lee B. Danzey, Arlington, all of Mass., assignors to Brunswick Corporation, Skokie, Ill.

Division of Ser. No. 823,823, May 12, 1969, Pat. No. 3,591,915. This application June 28, 1971, Ser. No. 157,640

Int. Cl. F15d *1/00*

U.S. Cl. 138—40 **23 Claims**



An orifice structure has one or more passages capable of controlling the amount of fluid that flows therethrough with the passage having an effective diameter ranging from 5 mils to 1 micron. The thickness of the orifice structure is at least 10 times greater than the effective passage diameter and the wall thickness of the structure is at least 5 times greater than the effective passage diameter.

3,730,228

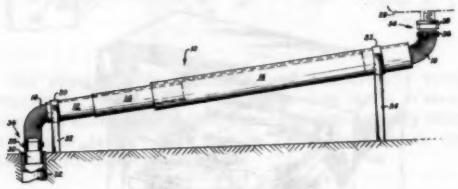
HOSE-CASE ASSEMBLY

Paul H. Gibbs, Sr., 201 Wenda Way, El Paso, Tex.

Filed Jan. 5, 1972, Ser. No. 215,463

Int. Cl. F16l *7/00, 9/22, 57/00*

U.S. Cl. 138—106 **6 Claims**



A hose case for supporting and enveloping a flexible hose that is capable of longitudinal extension and contraction in any position of extension and contraction of the hose. The case is formed of a plurality of telescoping tubular sections, through which the hose extends, that can be relatively extended and contracted in correlation with the extension and contraction of the hose.

3,730,229

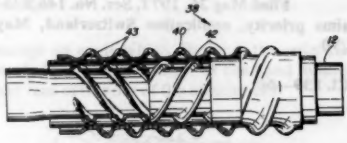
TUBING UNIT WITH HELICALLY CORRUGATED TUBE AND METHOD FOR MAKING SAME

Mario L. D'Onofrio, Hartford, Conn., assignor to Turbotec, Incorporated, South Windsor, Conn.

Filed March 11, 1971, Ser. No. 123,150

Int. Cl. F16l *9/18*

U.S. Cl. 138—114 **2 Claims**



A tubing unit useful, for example, as part of a heat exchanger includes a first tube containing a second helically corrugated tube having on its outer surface helical ridges which engage the inner wall of the first tube to mechanically lock the two tubes in assembly and to form one or more helical passageways between the first and second tubes. The first tube may be of a substantially straight cylindrical shape or may include helical grooves on its inner surface for receiving and mating with the radial outer end portions of the helical ridges on the outer surface of the second tube. A third tube may surround the first tube and include helical corrugations with inwardly extending ridges engaging the outer surface of the first tube to form another set of helical passageways between the first tube and the third tube. In the making of the tubing unit, the second tube is assembled over a mandrel and within the first tube and then twisted to form the helical corrugations therein, the mandrel limiting the inward growth of the inwardly extending ridges and the first tube limiting the outward growth of the outwardly extending ridges. In cases where a third tube is used, such third tube is placed over the second tube and twisted to form helical corrugations therein, the outer surface of the first tube limiting the radial inward growth of the inwardly extending ridges thereof.

3,730,230

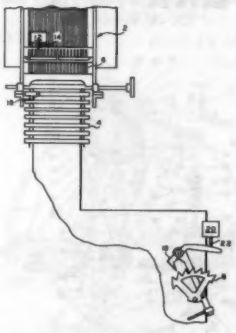
APPARATUS FOR CONTROLLING THE PICK COUNT PER INCH OF A LOOM

Rudolfs Kodis, Greenville, S.C., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 16, 1970, Ser. No. 89,899

Int. Cl. D03c *19/00*; D03d *49/20*

U.S. Cl. 139—24 **6 Claims**



A switch is associated with at least one pegging element mounted on the dobby chain of a conventional dobby loom and is connected to a plunger positioned adjacent the pick pawl of the take-up ratchet wheel of the loom for actuating the

plunger and increasing the pick count per inch of the cloth in response to closing of the switch by the pegging element through an indexing element of the loom.

3,730,231

WEDGE COUPLING DEVICE BETWEEN A DRIVING SHAFT AND A CONNECTING ROD

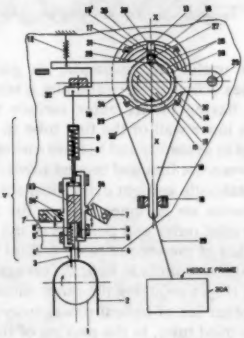
Ernst Hoenig, Horgen-Zurich, Switzerland, assignor to Staubli Ltd., Horgen-Zurich, Switzerland

Filed May 26, 1971, Ser. No. 146,875

Claims priority, application Switzerland, May 29, 1970, 8034/70

Int. Cl. D03c *1/00*

U.S. Cl. 139—66 **7 Claims**



Dobby, in which the movement of the heald shafts is effected through a connecting rod **18**, which connecting rod embraces an eccentric ring **28** on the driving shaft **15**. Release of the movement is brought about by a coupling wedge **13**, which is supported in the eccentric ring and for control purposes connects with the drive shaft of the connecting ring. The patternlike control of the wedge is effected by an arm **10** which is tiltable in a plane which is radial of the driving shaft. The arm has an opening **14** embracing the shaft, the offset collar **34** of which engages a groove **27** of the wedge.

3,730,232

DOBBY WITH A DEVICE FOR MOVING ALL HEALD FRAME INTO THE SAME POSITION

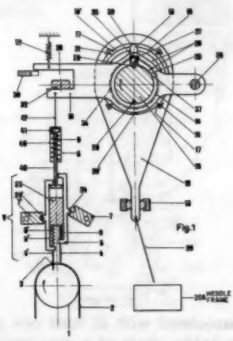
Walter Kleiner, Wadenswil, Switzerland, assignor to Staubli Ltd., Horgen-Zurich, Switzerland

Filed May 26, 1971, Ser. No. 146,867

Claims priority, application Switzerland, May 29, 1970, 8035/70

Int. Cl. D03c *1/00, 15/00*

U.S. Cl. 139—66 **12 Claims**



Dobby with a device for moving all heddle frame of a Jacquard loom to the same height, for example the central position or the upper shed position, which machine has a wedge type coupling wherein the wedge is to be controlled according to a preselected pattern. An adjusting cam **32,39** is arranged in the control mechanism for the wedge **13**, which adjusting cam limits movement of the control arm **10**. In order that this does not result in an overloading of any part of the machine, a compensating spring **9** is also arranged in the control mechanism.

3,730,233

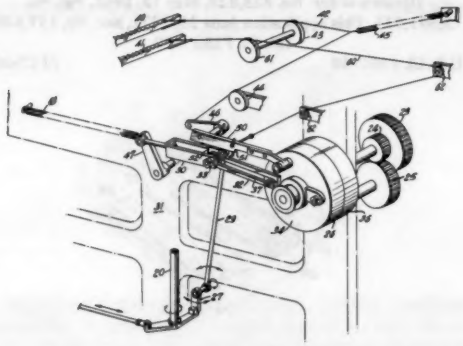
LOOM TAKE UP MOTION

Richard E. Goff, Barrington, and Antonio Schiappa, Pawtucket, both of R.I., assignors to Johnson & Johnson, New Brunswick, N.J.

Division of Ser. No. 823,661, May 12, 1969, Pat. No. 3,685,549. This application June 25, 1971, Ser. No. 143,689

Int. Cl. D03d *49/20*

U.S. Cl. 139—309 **2 Claims**



A strip of narrow woven fabric having elastic sections and non-elastic sections predeterminedly spaced along the length of the fabric. The fabric is continuously woven with areas having less picks per inch than other areas so that the areas containing the fewer picks are elastic and the other areas are non-elastic with spaced areas woven to provide smooth cutting areas for manufacturing a plurality of strips of narrow material.

3,730,234

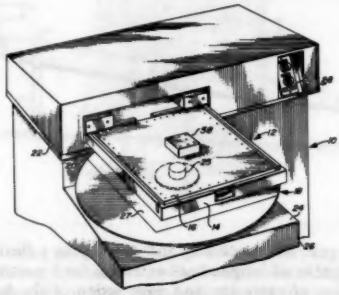
TERMINAL PIN STRAIGHTENING MACHINE

Patrick George Hesselmann, Phoenix, Ariz., assignor to Honeywell Information Systems Inc., Waltham, Mass.

Filed Jan. 7, 1972, Ser. No. 216,150

Int. Cl. B21f *1/02*

U.S. Cl. 140—147 **16 Claims**



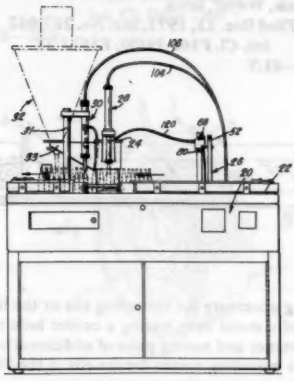
A novel machine and method for simultaneously straightening a field of terminal pins inserted into a circuit panel assembly.

3,730,235

APPARATUS FOR FILLING CONTAINERS

Roy D. Lewis, Montreal, Quebec, Canada, assignor to G. Diehl Mateer Co., Strafford, Pa.

Division of Ser. No. 823,348, May 9, 1969, abandoned. This application Dec. 30, 1970, Ser. No. 102,857
Int. Cl. B65b *43/50*
U.S. Cl. 141—172 **4 Claims**



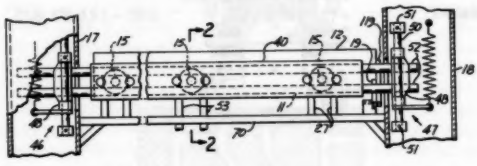
A machine for automatically filling containers such as ampoules and the like having a circular indexing table for moving the containers through a filling station. A liquid filling device having a discharge nozzle, an adjustable volume metering chamber and a valve controlling the filling of the chamber and the discharging of the liquid to the container through the nozzle. A powder filling device having a reservoir and a nozzle, the powder filling device and the liquid filling nozzle being rotatably mounted for alternative use at the filling station.

3,730,236

APPARATUS FOR ROUTING RECESSES IN DOORS AND THE LIKE

Donald V. Frydenberg, Arlington, Tex., assignor to Clary Corporation, San Gabriel, Calif.

Filed May 3, 1971, Ser. No. 139,730
Int. Cl. B27f *5/02*
U.S. Cl. 144—27 **9 Claims**



An apparatus for accurately and concurrently routing recesses in both doors and associated door jambs to receive hinges of different sizes. The apparatus automatically follows a templet device which can be readily adjusted to form recesses for different size hinges.

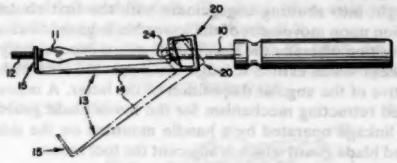
3,730,237

SCREW-SUPPORTING ATTACHMENT FOR THE SHANK OF A SCREW DRIVER TOOL

William M. Hanzlik, Route 3, Brewster, N.Y.

Filed July 23, 1971, Ser. No. 165,467
Int. Cl. B25b *15/02, 23/08*
U.S. Cl. 145—52 **2 Claims**

This attachment has its end remote from its screw-supporting yoke formed of a pair of resilient wings embracing the shank of the tool and so formed that the attachment is not only longitudinally slidably mounted on the shank but is also readily tiltable through an angle which displaces the yoke clear of the screw merely by pressing a finger of the hand holding the tool against the rear extremity of the attachment.

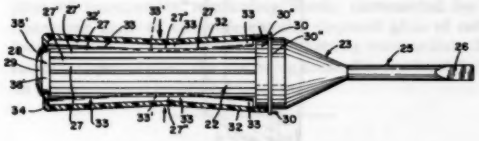


3,730,238

FRICTION TYPE SCREWDRIVER

Richard G. Butler, Box No. 391, Gimli, Manitoba, Canada

Filed Sept. 21, 1971, Ser. No. 182,321
Int. Cl. B25g *1/00*
U.S. Cl. 145—76 **1 Claim**



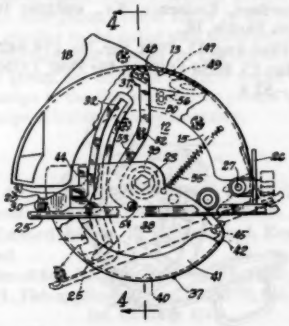
The invention comprises a screwdriver having an inner handle fixed to the working end of the screwdriver. A resilient sleeve is rotatably mounted about the inner handle, and is compressable radially by the operator against the inner handle to frictionally engage the inner handle. The operator will compress the resilient sleeve against the inner handle and turn resilient sleeve to turn the inner handle and working end of the screwdriver through the frictional engagement between the sleeve and the inner handle. Thereafter he will release the compression of the resilient sleeve and rotate the sleeve relative to the inner handle and working the end of the screwdriver back to its original position.

3,730,239

CIRCULAR SAW WITH IMPROVED MOVABLE GUARD CONSTRUCTION

Frank A. Kaman, Prospect Heights, and Harold McConnaughay, Batavia, both of Ill., assignors to Skil Corporation, Chicago, Ill.

Filed Dec. 10, 1971, Ser. No. 206,639
Int. Cl. B27g *19/04*
U.S. Cl. 143—159 H **5 Claims**



The adjustably mounted base plate carries a first abutment formation adjacent the trailing end of the slot which is formed

therein to receive the circular saw blade. The lower blade guard has a second abutment formation thereon adjacent its work-engaging forward end. The second abutment formation is brought into abutting engagement with the first abutment formation upon movement of the lower blade guard toward its open position whereby the lower blade guard exposes only the blade teeth which extend through the slot in the base plate irrespective of the angular disposition of the latter. A manually operated retracting mechanism for the lower blade guard includes linkage operated by a handle mounted on the side of the fixed blade guard which is adjacent the tool motor.

3,730,240

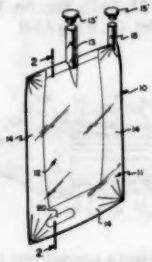
INFLATABLE INSULATION FOR PACKAGING

Michael C. Presnick, c/o Metatronics Manufacturing Corp., 111 Bloomingdale Road, Hicksville, N.Y.

Filed March 16, 1971, Ser. No. 124,717

Int. Cl. F28b *7/00*

U.S. Cl. 150—2.5 **3 Claims**



The invention disclosed herein relates to the use of dead air spaces to provide insulation for packaged materials. In one form of the invention, a nested pair of thermoplastic bags define an inflatable chamber therebetween, which chamber, upon being filled with air, provides a dead air space between the ambient atmosphere and the inner bag. The air space provides thermal insulation for the packaged material within the inner bag. In another form of the invention, a series of inflatable bi-walls, which are articulated to one another for subsequent formation into a rectangular parallelepiped shape, are disposed as a liner within a conventional corrugated paperboard container. When inflated, the bi-walls will insulate the packaged contents of the container. The bi-walls of the inflatable insulation used in either of the embodiments of the invention are fabricated from inexpensive, flexible but substantially non-elastic, thermoplastic film material which may be fabricated by conventional techniques and which may be readily heat sealed into any of the desired configurations.

3,730,241

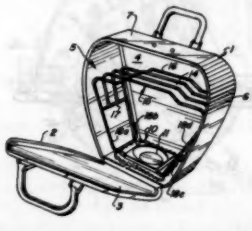
BOWLING BALL, BAG AND SHOE RACK

Robert Richardson, Eminence, Ky., assignor to Brunswick Corporation, Skokie, Ill.

Filed Aug. 11, 1971, Ser. No. 170,942

Int. Cl. B65d *65/02;* **A45c** *3/00, 13/00*

U.S. Cl. 150—52 A **4 Claims**



The invention is a side opening bowling ball bag with removable shoe rack. The bottom of the bag is a molded plastic element forming a ball retaining cup and a series of horizontal sockets. The legs of the shoe rack terminate in feet which removably engage the sockets in the bag bottom and are urged into the sockets by the spring action of the rack structure.

3,730,242

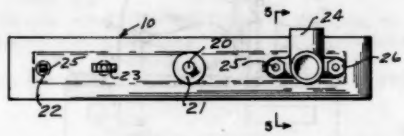
ONE-BOLT MOUNT

Warren R. Dale, Wever, Iowa

Filed Dec. 13, 1971, Ser. No. 207,062

Int. Cl. F16b *39/00;* **F16l** *3/22*

U.S. Cl. 151—41.7 **1 Claim**



A plumbing accessory for mounting ells or the like to a wall in the form of a metal strip having a center hole receiving an anchoring fastener and having pairs of additional holes providing adjustable mounting means for the ells or the like.

3,730,243

FRICTION LOCKS

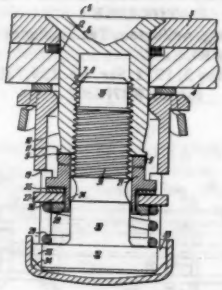
Howard John Leonard Smith, Badshot Lea, Farnham, England, assignor to Dzus Fastener Co., Inc., West Islip, N.Y.

Filed Aug. 26, 1971, Ser. No. 175,152

Claims priority, application Great Britain, Sept. 3, 1970, 42,283/70

Int. Cl. F16b *39/28*

U.S. Cl. 151—41.5 **10 Claims**



A fastener comprises a stud having a shank with a screw threaded bore and a receptacle assembly including an externally screw threaded pin over which the stud may be screwed. The receptacle assembly also includes an axially slotted barrel containing a friction clutch which comprises a non-rotatable part in the form of a washer with projections extending into the slots of the barrel and a rotatable part including two members between which the washer is trapped together with a spring washer for providing frictional engagement between the rotatable and non-rotatable parts. The end of the stud has four recesses which co-operate with a pair of projections on the rotatable part of the clutch. As the stud is screwed over the pin the recess in the stud end engage the projections on the rotatable part of the clutch and further turning of the stud is then opposed by the frictional torque provided by the clutch. A light spring is provided within the barrel for urging the clutch into engagement with the stud end.

3,730,244

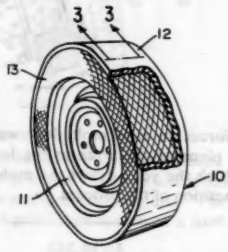
COMPRESSIBLE VEHICLE TIRE

William Campbell Ross, Winchester, Mass., assignor to W. R. Grace & Co., Cambridge, Mass.

Continuation-in-part of Ser. No. 71,801, Sept. 14, 1970, which is a continuation-in-part of Ser. No. 725,577, April 17, 1968, Pat. No. 3,568,286, which is a continuation-in-part of Ser. No. 588,174, Oct. 20, 1966, abandoned. This application May 11, 1971, Ser. No. 142,273

Int. Cl. B60c 7/60

U.S. Cl. 152—323 12 Claims



A compressible vehicle tire is disclosed wherein elastomer-coated filaments (e.g., synthetic rubber coated glass filaments) are wound on a core at an angle to the core and apart from one another and are joined at the cross-over points by the elastomer. The filaments are wound in such a manner that void spaces are defined by the filaments resulting in a porous, compressible structure. The outer surface may be covered with a layer of conventional tread compound.

3,730,245

PNEUMATIC TIRE FOR HIGH-SPEED MOTORCYCLE

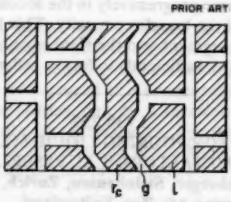
Sigeru Kusunoki; Yoshitsugu Murakami, both of Kodaira; Yutaka Tashiro, Kuroiso; and Kazuki Tabata, Okita, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed March 10, 1971, Ser. No. 122,959

Claims priority, application Japan, March 18, 1970, 45/22467

Int. Cl. B60c 11/04

U.S. Cl. 152—352 7 Claims



A pneumatic tire for motorcycles, which provides a wide effective contact area with the road surface regardless of whether the motorcycle is in vertical or inclined posture. The tire includes a tread having a central groove extending along the tire equator, a pair of central ribs circumferentially extending along opposite sides of the central groove, and a plurality of independent blocks disposed on shoulder portions of the tread.

3,730,246

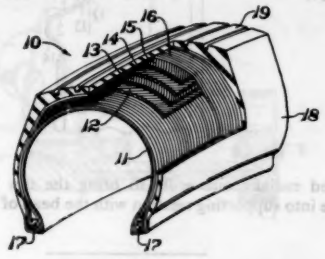
PNEUMATIC TIRE

James Sidles, West Richfield, Ohio; Dennis P. Skala, Fairview, Pa., and Leonard Skolnik, Cleveland, Ohio, assignors to The B. F. Goodrich Company, New York, N.Y.

Division of Ser. No. 713,373, March 15, 1968, Pat. No. 3,560,286. This application Oct. 29, 1970, Ser. No. 84,970

Int. Cl. B60c 9/20

U.S. Cl. 152—356 4 Claims



A pneumatic tire comprising a carcass of radially disposed plies of inextensible reinforcing cords, surmounted by a restricting band of circumferentially disposed plies of reinforcing cords of predetermined stretchability intermediate the radially disposed plies, the tire being formed in flat band form on a conventional building drum.

3,730,247

REPAIR PATCHES AND METHODS

John D. White, 239 South Irvindale Avenue, Azusa, Calif.

Continuation-in-part of Ser. No. 845,204, July 28, 1969, abandoned. This application May 24, 1971, Ser. No. 146,265

Int. Cl. B60c 21/02

U.S. Cl. 152—367 26 Claims

An inflatable structure, such as an automobile tire or a rubber boat, or a patch for use in the repair of pneumatic devices, has first and second groups of elastic strips woven as strips in intertwining relationship.

A method of repairing a damaged portion of a radial ply tire uses a tire patch having a first group of elastic strips and a second group of elastic strips extending at right angles to the strips in the first group. These strips in the first group are oriented in parallel to the radial plies when the repair patch is applied to the damaged portion. In this manner, the strips in the second group are oriented at right angles to the radial plies. The strips in the first and second groups are preferably woven as strips in intertwining relationship.

3,730,248

RIM FOR MOUNTING PNEUMATIC TIRES ON WHEELS

George David Beharrell, 153 Darridge Road, Solihull, and George Edward Adams, 18 Villiers Road, Kenilworth, both of England

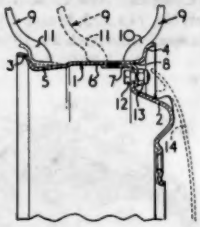
Division of Ser. No. 595,746, Nov. 21, 1966, Pat. No. 3,588,981. This application Nov. 20, 1970, Ser. No. 91,265

Int. Cl. B60c 5/16

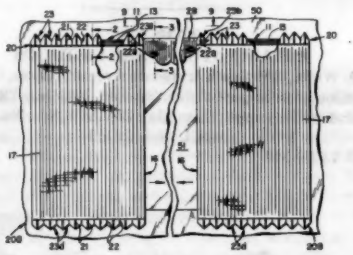
U.S. Cl. 152—379 2 Claims

A pneumatic tire and rim assembly is comprised of a one piece rim having an inwardly depressed well portion with a tire

bead-retaining flange which is depressed inwardly to permit the pneumatic tire to pass over the depressed flange. After the tire is positioned the inwardly depressed well portion is expanded radially outwardly to bring the tire bead-retaining flange into supporting relation with the bead of the pneumatic tire.



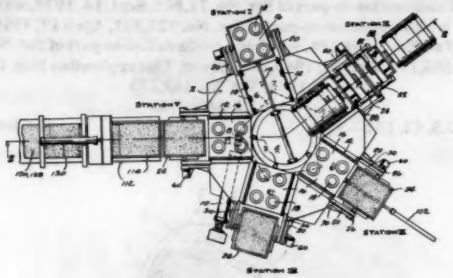
3,730,249
DRAPERY INSTALLATIONS
Morris Hess, 436 Fort Washington Avenue, New York, N.Y.
Filed Jan. 24, 1972, Ser. No. 220,186
Int. Cl. A47h *1/00*
U.S. Cl. 160—126 **2 Claims**



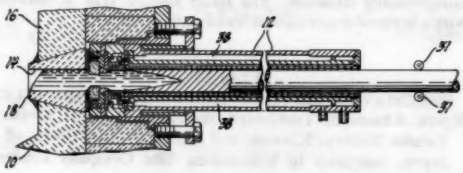
In common drapery installations consisting of two panels slidably suspended from a support rod and adapted to be moved together or apart, when they are separated the position of the support rod between the panels is exposed to view. This invention provides an intermediate and also slidably suspended fabric vertically dimensioned to conceal the support rod when the panels are spaced apart and provides accordeon-pleated strips forming the upper edges of the panels in the outline of upward projections, with the juxtaposed end projections of the two strips extending outward at an angle to the rod in the form of flaps. When the panels are brought together the intermediate fabric is collapsed and concealed between the said two flaps and the portions of the panels immediately below the flaps.

3,730,250
METHOD OF MAKING A SAND MOLD
Harrison E. Fellows, Clearwater Lake, Wis.
Division of Ser. No. 790,072, Jan. 9, 1969, Pat. No. 3,589,431.
This application Jan. 28, 1971, Ser. No. 110,654
Int. Cl. B22c *15/22*
U.S. Cl. 164—22 **6 Claims**

Bottomless cope and drag boxes mounted on a turntable are cleaned, assembled upon a pattern plate, turned on edge and clamped between closure platens and filled with molding sand. The platens are then advanced into the boxes to compress the sand against the patterns to form molds. Upon withdrawal of the platens, a sprue hole is made, the assembly is rotated to horizontal, and the boxes and contained molds are separated from the pattern plate, which is then withdrawn. After insertion of cores, if any, the boxes and molds are re-closed. An elevator rises through a withdrawal yoke into engagement with the mold whereupon a complementary platen opposing the elevator forces the sand mold downwardly from the boxes and into the plane of the yoke to the level of a withdrawal table onto which the yoke draws the mold, leaving the boxes empty for repetition of the process.



3,730,251
METHOD OF CONTINUOUS CASTING
Fred J. Webbere, Orchard Lake, and Robert G. Williams, Birmingham, both of Mich., assignors to General Motors Corporation, Detroit, Mich.
Continuation-in-part of Ser. No. 827,673, May 26, 1969, abandoned. This application June 21, 1971, Ser. No. 155,263
Int. Cl. B22d *11/02*
U.S. Cl. 164—82 **6 Claims**

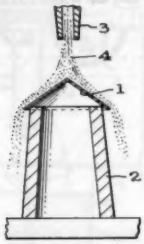


Method involves continuously but incrementally passing molten metal directly from a holding vessel progressively through an open-ended mold containing three consecutive zones. The first zone immediately adjacent the holding vessel conveys the molten metal to the second zone without significant solidification due to its low heat transfer capacity. A thin skin of metal forms progressively in the second zone due to its relatively high heat transfer capacity. This thin skin is then transferred as a segment into the third zone in which the molten metal solidifies sufficiently to form a self-sustaining rod.

3,730,252
PROCESS FOR POURING LIQUID MELTS FROM METALLURGICAL VESSELS
Emil Schnurrenberger, Steinhausen, Zurich, Switzerland, assignor to Interstop AG, Zug, Switzerland
Filed Dec. 30, 1971, Ser. No. 214,165
Claims priority, application Germany, Jan. 8, 1971, P 21 00 632.6
Int. Cl. B22d *7/12*
U.S. Cl. 164—134 **7 Claims**

A process and apparatus for pouring a liquid melt from a metallurgical vessel such as a ladle wherein the pouring-out opening is provided with a solidification-preventing, loose filler, before the vessel is filled with the liquid melt. The pouring-in opening of the container prior to pouring which receives the liquid melt is covered with a protective screen

inclined in relation to the axis of the pouring jet. The screen consists of a material that cannot be inflamed by the filler but is inflammable by the melt. The protective screen between the pouring-out opening of the vessel and the pouring-in opening of the container to receive the liquid melt may be paper, cardboard or a readily inflammable synthetic resin. The screen may have a thickness of about 1 – 2 mm and a smooth surface on the side which faces the outflowing melt. The screen may be a conically shaped protective screen or a roof-shaped protective screen.



3,730,253

PATTERN DEVICE FOR FOUNDRY MOLDS

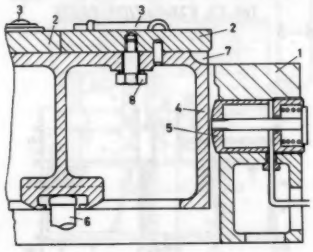
Erwin Buhrer, Vogelingasschen 40, Schaffhausen, and Franz Keller, Neuhausen am Rheinfall, both of Switzerland, assignors to said Buhrer, by said Keller

Filed April 27, 1971, Ser. No. 137,828

Claims priority, application Switzerland, May 15, 1970, 7332/70

Int. Cl. B22c 7/04

U.S. Cl. 164—241 **4 Claims**



Disclosed is a device for replacing patterns for molds disposed on a replaceable pattern supporting unit. The pattern unit is centered by a centering frame and supported on a lifting member. The lifting member is connectable to the bottom of the pattern supporting unit by a turnable locking flange biased downwardly by a spring or hydraulically. At the lowered position of the unit, the flange locks this unit to the pattern table and during the lift of the unit the flange becomes released.

3,730,254

ROLLER PAIR TYPE CONTINUOUS CASTING APPARATUS

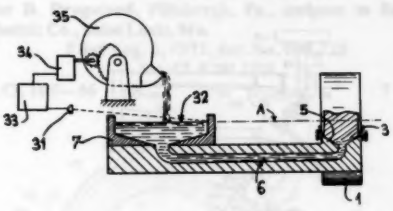
Philippe Namy, Saint-Etienne, France, assignor to Creusot-Loire, Paris (Seine), France

Filed Dec. 18, 1970, Ser. No. 99,426

Int. Cl. B22d 11/06

U.S. Cl. 164—268 **5 Claims**

In the continuous casting of a metallic band or strip, more particularly of steel, by injecting the molten metal between two cooled cylinders which are rotated in such manner that the facing portions of their peripheries move in unison in the direction of injection, the cast strip is maintained on the periphery of one of the cylinders until it is substantially fully solidified. The pressure head at the outlet of the injection nozzle corresponds to a level of molten metal situated above the nip of the cylinders. The inner side of the lateral cheeks which prevent the molten metal from flowing laterally is heated to prevent substantial solidification of the edges of the strip before same has passed through the nip. The cast strip is cooled on the cylinder on which it is maintained, as for instance by a water spray. The other cylinder is continuously lubricated to prevent sticking of the cast strip thereon. In a modification the horizontal axes of the cylinders are in a non horizontal plane, the cast strip being maintained against the lower cylinder.



3,730,255

CONTINUOUS CASTING MACHINE

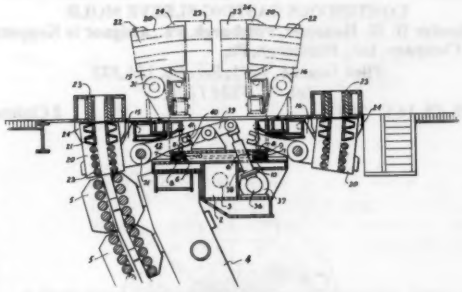
Georg Bollig, Buederich; Josef Zeller, Weesen, and Willi Simons, Duesseldorf, all of Germany, assignors to Schloemann Aktiengesellschaft, Dusseldorf, Germany

Filed Dec. 14, 1971, Ser. No. 207,929

Claims priority, application Germany, Dec. 14, 1970, P 20 61 436.2

Int. Cl. B22d 11/08

U.S. Cl. 164—274 **6 Claims**



In a continuous casting machine two molds, each having the first section of the apron of a secondary cooling zone connected thereto to form a unit, are mounted on a turntable which is rotatable on a vertical axis. Each of said units is mounted to swing on said turntable on a horizontal axis. Thus, while one of said units is in casting position, and while casting continues, the other unit may be repaired or exchanged for a unit of different casting cross-section. To shift from one unit to another, both units are swung upwardly on their horizontal axes, and the turntable is then rotated on its vertical axis to bring the selected unit to proper position to allow the unit to be swung down to casting position.

3,730,256

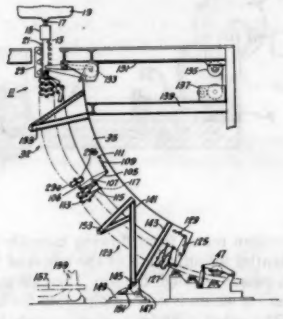
APPARATUS FOR BENDING CONTINUOUS CAST SLABS

Kurt Reinfeld, and Emmanuel V. Gouye, both of Pittsburgh, Pa., assignors to Koppers Company, Inc., Pittsburgh, Pa.

Division of Ser. No. 837,851, June 30, 1969, Pat. No. 3,590,908. This application Jan. 7, 1971, Ser. No. 104,817

Int. Cl. B22d *11/12*

U.S. Cl. 164—282 **8 Claims**



A slab emerging from a casting mold is supported by an articulated roller chain resiliently biased and mounted to a frame. Groups of rollers comprising such chain are mounted to equalizing brackets, and one group of rollers is secured to a piston-cylinder assembly. When the piston cylinder assembly is actuated, the rollers connected thereto exert a bending force on the slab which curves and is supported by the articulated roller chain.

3,730,257

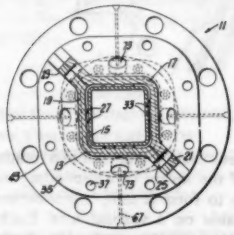
CONTINUOUS CASTING SLEEVE MOLD

Theodor H. W. Haussner, Pittsburgh, Pa., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed June 24, 1971, Ser. No. 156,325

Int. Cl. B22d *11/02*

U.S. Cl. 164—283 **2 Claims**



The jacket of the mold is comprised of two cast iron halves, each of which has from two to four or more longitudinally extending ridges which contact and support a copper mold sleeve. The ridges maintain the sleeve in spaced relation to the jacket and thereby form cooling water flow passages.

3,730,258

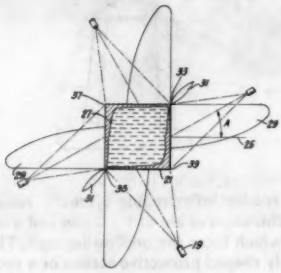
SPRAY COOLING FOR CONTINUOUS CAST STRAND

Rufus Easton, Pittsburgh, Pa., assignor to Kopper Company, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 868,093, Oct. 21, 1969, abandoned. This application May 27, 1971, Ser. No. 147,331

Int. Cl. B22d *11/12*

U.S. Cl. 164—283 **6 Claims**



A plurality of nozzles, lying in spaced apart planes normal to the longitudinal axis of the cast strand, are disposed obliquely to the faces of the cast strand and in zones outside of the regions in which the liquid metal issuing from a breakout flows.

3,730,259

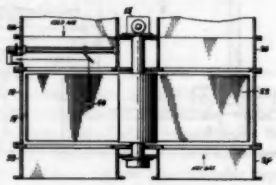
HOT-SPOT DETECTOR FOR HEAT EXCHANGER

Donald F. Wixson, Wellsville, and George K. Ostrander, Angelica, both of N.Y., assignors to The Air Preheater Company, Inc., Wellsville, N.Y.

Filed March 2, 1972, Ser. No. 231,273

Int. Cl. F28d *17/00, 19/00*

U.S. Cl. 165—5 **14 Claims**



A "hot-spot" detecting arrangement for a heat exchanger that receives a flow of hot exhaust gases containing unburned products of combustion. The arrangement detects "hot-spots" or developing fires in deposits of said unburned products of combustion before high temperature is allowed to damage the integrity of the heat exchanger.

3,730,260

HEAT EXCHANGER APPARATUS FOR HYDRAULIC SYSTEM

Robert E. Raymond, Zanesville, Ohio, assignor to International Basic Economy Corporation, New York, N.Y.

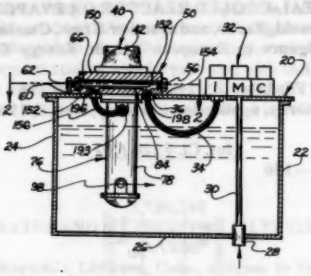
Filed March 18, 1971, Ser. No. 125,527

Int. Cl. F25b *29/00*

U.S. Cl. 165—27 **6 Claims**

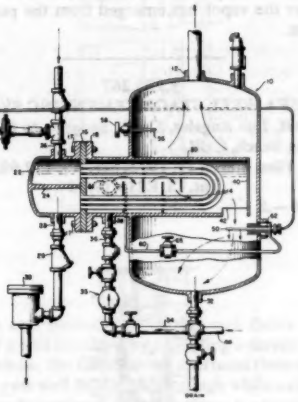
An improved heat exchanger apparatus adapted to be removably mounted on a reservoir means and extended through an opening in the wall thereof so as to be disposed in the bath of fluid therein. The heat exchanger apparatus is

further characterized by an integral water flow control valve and temperature probe which are uniquely mounted within



the module so as to provide a unique modular cooling unit with all of the element thereof packaged within a single removable heat exchanger unit.

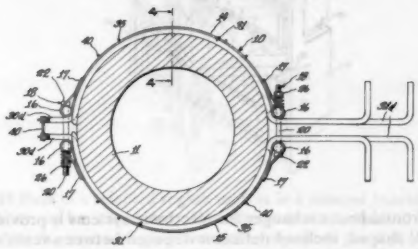
3,730,261
WATER HEATING SYSTEM
John A. Clark, Jr., East Stroudsburg, Pa., assignor to The Patterson-Kelley Co., Inc., East Stroudsburg, Pa.
Filed April 26, 1971, Ser. No. 137,127
Int. Cl. B60h *1/00*
U.S. Cl. 165—39 **3 Claims**



This invention relates to an industrial water heater of the so-called "instantaneous" type, featuring in functional combination; a single, compactly-sized, water storage tank; a heating tube bundle extending into the tank and enclosed within a novel water flow control shroud; the shroud being in communication with the discharge of a water circulating pump operating continuously to draw water from the tank and to circulate it through the shroud. The shroud is closed at its outer end and at its inner end except for a downwardly directed discharge opening. A circulating water temperature sensing bulb is disposed immediately adjacent to and in line with the flow of water from the shroud discharge, and is operable to regulate the rate of heat energy flow through the tube bundle so as to attain an improved water temperature change response, and constant maintenance of a desired storage water temperature condition.

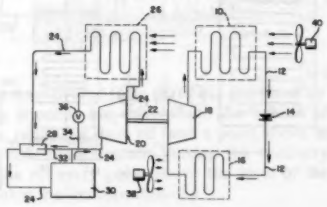
By virtue of the arrangement of the invention the heated water delivered from the shroud is directed downwardly into a water temperature "blending" section of the tank wherein it participates in a kinetic-convection temperature blending process before it rises to the upper section of the tank wherefrom it is immediately available for withdrawal through the service outlet from the tank. The invention also contemplates employment of an improved heat supply requirement anticipating arrangement, whereby an improved sensitivity of automatic operational control is achieved.

3,730,262
HEATING AND COOLING UNITS
Lester D. Drugmand, Pittsburgh, Pa., assignor to Emerson Electric Co., Saint Louis, Mo.
Filed Aug. 6, 1971, Ser. No. 169,728
Int. Cl. F28f *7/00*
U.S. Cl. 165—46 **7 Claims**



A heating and cooling unit comprising a flexible metal band formed in halves connected end-to-end around an object. The band carries a sheathed electric heating element and a metal cooling tube so that the object may be either heated or cooled. The heating element and cooling tube are pressed into direct engagement with the peripheral surface of the object when the bandis positioned around the latter.

3,730,263
HEAT PUMP
James H. Anderson, 1615 Hilock Lane, York, Pa.
Division of Ser. No. 703,156, Feb. 5, 1968, Pat. No. 3,519,066.
This application Nov. 26, 1969, Ser. No. 877,553
Int. Cl. F28d *28/00*
U.S. Cl. 165—86 **5 Claims**



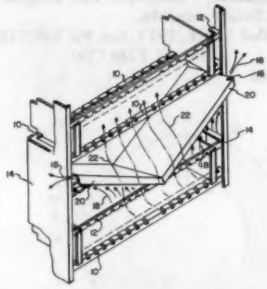
A heat pump having a closed cycle refrigeration system including a condenser, evaporator and compressor and a vaporized fluid power system for driving the compressor including a boiler and condenser. The condensers are arranged in such a manner that heat is transferred to the ambient when the apparatus is utilized to cool a conditioned zone and heat is transferred to the conditioned zone when the apparatus is utilized to heat a conditioned zone. The evaporator simultaneously removes heat from the conditioned zone during cooling thereof and removes heat from the ambient during heating of the conditioned zone. A fluid bypass system is provided to supply heat directly from the boiler to the condenser of the vaporized fluid power system during extreme, low ambient temperature conditions when the conditioned zone is being heated.

3,730,264

FRONTAL HEAT EXCHANGER FOR RACKS OF HEAT DISSIPATING APPARATUS

Konstanty E. Krylow, Elmhurst, and William A. Reimer, Wheaton, both of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Oct. 1, 1971, Ser. No. 185,651
Int. Cl. H02b *1/00*
U.S. Cl. 165—128 **4 Claims**



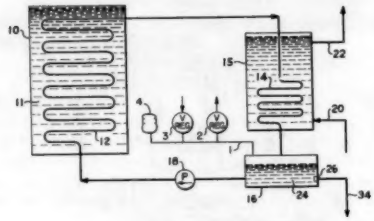
A frontal heat exchanger for electronic systems is provided by a V-shaped, inclined deflector disposed between vertically adjacent arrays of heat dissipating apparatus. Heated air moving upward by convection is directed from the electronic system while cool air is drawn into the system over the upper surface of the deflector.

3,730,265

SHUT-DOWN SYSTEM FOR HEAT STORAGE EXCHANGE APPARATUS

Willis Thompson Lawrence, Winchester, Mass., assignor to Hooker Chemical Corporation, Niagara Falls, N.Y.

Continuation of Ser. No. 822,117, May 6, 1969, abandoned.
This application Oct. 15, 1970, Ser. No. 81,124
Int. Cl. F28f *19*
U.S. Cl. 165—134 **6 Claims**



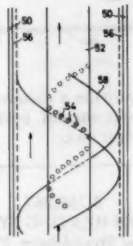
A rapidly corrodible metal drain plug disposed in the condensate return line of a heat storage-exchange system effectively evacuates alkaline heat transfer fluid, thereby preventing the transfer of heat from an alkaline heat storage composition when leakage between the storage composition and heat transfer fluid has occurred. The corrodible plug may be disposed in a condensate return line, condensate reservoir or the condensate pump and may be made of aluminum, zinc, tin, titanium or tantalum. A pressure regulating sub-system is provided upstream of the corrodable metal drain plug to adjust the pressure in the condensate return line to substantially atmospheric pressure, thereby eliminating the reduced pressure always found at the exhaust side of the condenser and thus permitting rapid and positive evacuation of the system.

3,730,266

PROCESS AND APPARATUS FOR THE UNIFORM DISTRIBUTION OF COOLANT TO HEATING SURFACES IN A METAL-COOLED REACTOR OR EVAPORATOR

Heinz Kottowski, Ranco, and Gunther Grass, Casciago, both of Italy, assignors to European Atomic Energy Community (Euratom)

Filed Oct. 27, 1969, Ser. No. 869,776
Claims priority, application Germany, Nov. 6, 1968, P 18 07 986.2
Int. Cl. F22b *1/02*
U.S. Cl. 165—186 **6 Claims**



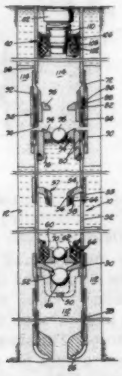
A heat exchange apparatus for a nuclear reactor utilizing a liquid metal coolant. The metal moves through ducts having perforations or a porous area through which it can penetrate. Means are provided for producing a flow of the vapor of the liquid metal to distribute it evenly over the surface to be cooled after the vapor has emerged from the perforations or porous area.

3,730,267

SUBSEA WELL STAGE CEMENTING SYSTEM

Lyle B. Scott, Los Angeles, Calif., assignor to Byron Jackson Inc., Long Beach, Calif.

Filed March 25, 1971, Ser. No. 127,982
Int. Cl. E21b *33/13*
U.S. Cl. 166—.5 **11 Claims**



A system for cementing plural cement stages in subsea wells having a well casing string connected to drill pipe and suspended from a casing hanger in a well bore below a subsea well head, the casing including a float collar; a lower first stage cementing plug releasably mounted above the float collar and below a stage cementing valve collar incorporated in the casing string, and an upper second stage cementing plug releasably mounted within the casing string above the stage cementing valve collar with actuating members of successively

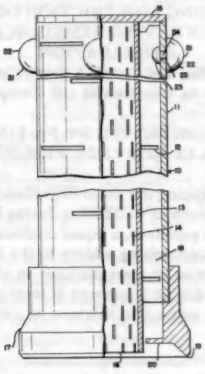
larger diameters which are adapted to pass through the drill pipe into the casing string and to successively: (a) release the first stage cementing plug, (b) close off the casing string below the stage cementing valve collar and open the cementing ports of the collar, and (c) release the second stage cementing plug which is adapted to close the cementing ports of the collar. Further cement staging may be provided with the casing string above the foregoing and below the casing hanger by providing appropriate additional components of the kind disclosed.

3,730,268

APPARATUS AND METHOD FOR FILTERING WELL FLUIDS

Floyd D. Burnside, Littleton, Colo., assignor to Shell Oil Company, New York, N.Y.

Filed June 8, 1971, Ser. No. 151,029
Int. Cl. E21b *21/00, 37/02*
U.S. Cl. 166—177 **7 Claims**



Apparatus and method for filtering well fluids standing in the casing of a well borehole by extending a screen filter down the well borehole, the filter having apertures therein of a sufficient size to pass well fluids therethrough while excluding particles of a predetermined size. The filter is closed at the top and open at the bottom and is extended into contact with the well fluids thus forcing the fluids up through the filter and out into the well borehole above the filter while trapping the particles therein.

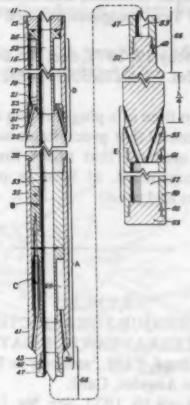
3,730,269

WELL BORE ACOUSTIC APPARATUS

Edward M. Galle, Houston, Tex., assignor to Hughes Tool Company, Houston, Tex.

Continuation of Ser. No. 52,484, July 6, 1970, abandoned, which is a division of Ser. No. 658,513, Aug. 4, 1967, Pat. No. 3,520,362. This application Nov. 22, 1971, Ser. No. 200,913
Int. Cl. E21b *43/16, 21/00*
U.S. Cl. 166—177 **22 Claims**

Following is disclosed well bore acoustical apparatus for generating large pressure variations in an isolated zone such as in the bore of a mineral producing well. The apparatus typically includes an oscillator unit and acoustic coupling device tuned to the operating frequency of the oscillator unit. The coupling device communicates through suitable exit ports



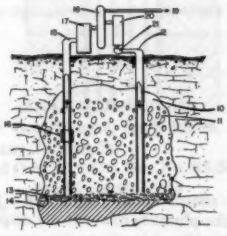
with fluid in a selected region such as in a mineral bearing formation to be stimulated. Acoustic and/or mechanical filters isolate the treated region from other regions in the well bore.

3,730,270

SHALE OIL RECOVERY FROM FRACTURED OIL SHALE

Victor D. Allred, Littleton, Colo., assignor to Marathon Oil Company, Findlay, Ohio

Filed March 23, 1971, Ser. No. 127,266
Int. Cl. E21b *43/24*
U.S. Cl. 166—247 **9 Claims**



Shale oil is recovered from vertically fractured oil shale formations by injecting hot solvent into the bottom of the fractured zone, removing shale oil from a point above the point of injection, then incrementally raising the recovery point to maintain the recovery point above the level of the silt sedimented within the fracture chimney.

3,730,271

METHOD OF SELECTIVELY PLUGGING A FORMATION WITH A POLYMERIC ELASTOMER LATEX-BRINE MIXTURE

James W. Gall, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 111,150, Jan. 29, 1971, abandoned. This application Nov. 19, 1971, Ser. No. 200,570
Int. Cl. E21b *33/138*; E02d *3/14*
U.S. Cl. 166—294 **10 Claims**

A method for selectively plugging a soil or a first interval of a porous subterranean formation and controlling the occurrence of said plugging by injecting into the formation a mixture containing brine, a volume of surfactant, a volume of sodium hypochlorite and a polymeric elastomer latex having a definite particle size.

3,730,272

PLUGGING SOLUTION PRECIPITATION TIME CONTROL

Edwin A. Richardson, Houston, and Ronald F. Scheuerman, Bellaire, both of Tex., assignors to Shell Oil Company, New York, N.Y.

Filed May 17, 1971, Ser. No. 144,260
Int. Cl. E21b *33/13, 43/25*
U.S. Cl. 166—294 6 Claims

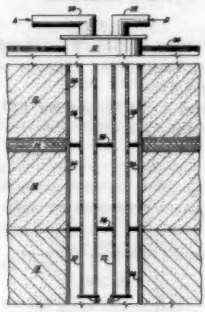
The precipitation time of a plug forming aqueous solution of both a polyvalent metal that precipitates as a gelatinous metal hydroxide and a reactant that raises the pH to cause the precipitation, is controlled, at least in part, by a reaction between nitrite ions and urea.

3,730,273

IMPROVED TECHNIQUE FOR INJECTING FLUIDS INTO SUBTERRANEAN FORMATIONS

James W. Wilson, Brea, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed April 30, 1971, Ser. No. 138,946
Int. Cl. E21b *43/16, 43/25, 43/27*
U.S. Cl. 166—269 20 Claims



A method for simultaneously injecting a plurality of fluid mixtures into a like plurality of vertically disposed subterranean strata penetrated by at least one injection well is disclosed. In the process, controlled quantities of at least two injection fluids are injected into the well bore at elevations adjacent each of the vertically disposed strata and the fluids are allowed to mix in the well bore at each elevation. A property promoting additive is incorporated within one of the injection fluids so that the resulting fluid mixtures contain the desired concentration of the additive. The mixtures are thereafter forced into the adjacent subterranean strata.

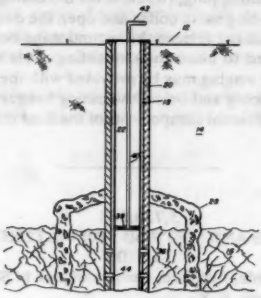
3,730,274

METHOD OF OFFSET EXPLOSIVE STIMULATION

Larry P. Brown, Tulsa, Okla., assignor to Cities Service Oil Company, Tulsa, Okla.

Filed Dec. 30, 1971, Ser. No. 214,053
Int. Cl. E21b *43/26*
U.S. Cl. 166—299 3 Claims

A production borehole is drilled to total depth into and through a producing formation and casing is set to an intermediate depth. A bridge plug is set below the casing shoe into the open hole section above the producing formation and one or more offset wells are drilled into the producing formation beginning at the open hole section of the production borehole between the casing shoe and the bridge plug. The offset holes



are loaded with explosive, plugged off, gravel packed and detonated in order to stimulate the well bore and surrounding formation.

3,730,275

METHOD USING LOW FRICTION LOSS LIQUID COMPOSITION HAVING RESISTANCE TO SHEAR DEGRADATION

Gifford G. McClaflin, and Dennis J. Royer, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Feb. 16, 1971, Ser. No. 115,867
Int. Cl. E21b *43/26*; F15d *1/02*
U.S. Cl. 166—308 5 Claims

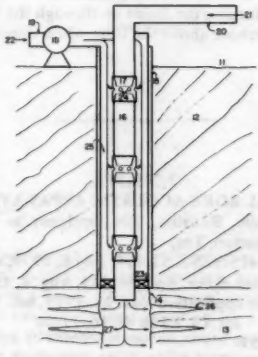
A method of reducing the shear degradation when pumping through conduits, such as well tubing during hydraulic fracturing operations and pipelines, a liquid containing a friction loss reducing additive comprising adding to the liquid the friction loss reducing additive at least partially in chunk or granular form so that the additive is present at least partially in chunk or granular form when the mixture is passed through the pump.

3,730,276

METHOD OF INCREASING PRODUCTIVITY AND THE INJECTIVITY OF OIL WELLS

Karl M. Land, Tulsa, Okla., assignor to Cities Service Oil Company, Tulsa, Okla.

Filed Feb. 8, 1971, Ser. No. 113,475
Int. Cl. E21b *43/00, 43/26*
U.S. Cl. 166—314 4 Claims



During injection into an injection tubing string or production from a production tubing string contained within an oil

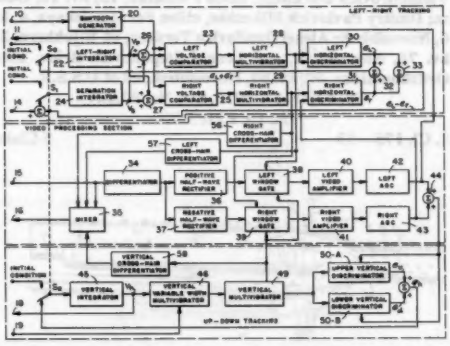
well, the tubing string is fitted with tubing joints or other couplings means which may be activated to allow the introduction therethrough of a friction reducing fluid, for example a polymer. The friction reducing fluid may be introduced at various lengths along the tubing string to reduce the opposing friction head of the fluid injected into or produced from the well. In particular, the invention is utilized when producing viscous crudes or for the reduction of friction losses when injecting treating fluids.

3,730,277

TARGET CENTER TELEVISION TRACKING SYSTEM

Joseph S. Brugler, Stanford, Calif., assignor to The United States of America as represented by the Secretary of the Navy

Filed Jan. 25, 1968, Ser. No. 703,228
Int. Cl. H04n *3/22*
U.S. Cl. 178—6.8 **7 Claims**



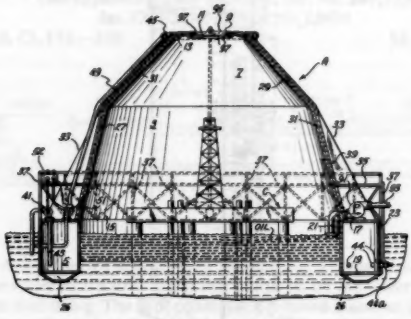
A target adaptive television contrast tracker for missile application wherein the adaptive feature comprises two independent linearly weighed tracking gates, one of which keeps account of positive target edge information, and the second keeps account of negative target edge information. The separation of the gates is arranged to coincide with the separation of the target edges, and the means raster position of the gates coincides with the center of the target.

3,730,278

SAFETY ENCLOSURE FOR OFF-SHORE OIL RIGS

Lawrence F. Roy, 27 Rambler Road, Southampton, Pa.

Filed Feb. 17, 1972, Ser. No. 227,053
Int. Cl. A62c *3/00*
U.S. Cl. 169—2 R **16 Claims**



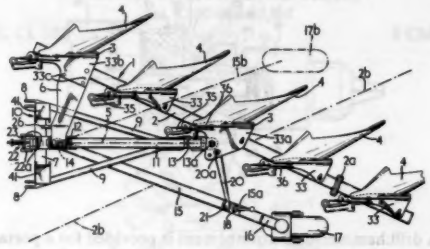
The floatable safety enclosure is formed by a plurality of upwardly extending, floatable wall sections which are adapted to be floated into position around an off-shore oil or gas well platform and secured together to form a continuous, dome-like wall around the platform.

3,730,279

REVERSIBLE PLOUGH SUPPORT MEANS WITH ALTERNATELY LATERALLY SWINGING WHEEL SUPPORT ARM

Charles Vernon Roger Dowdeswell, Lower Radbourne Farm, Southam, England

Filed Feb. 9, 1971, Ser. No. 113,942
Int. Cl. A01b *3/42*
U.S. Cl. 172—212 **4 Claims**



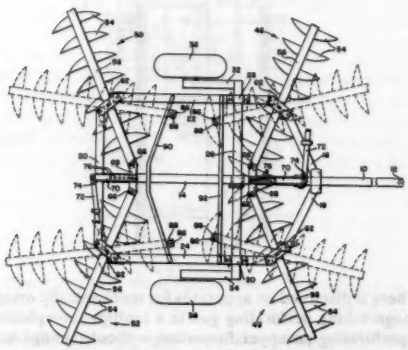
Support means for a reversible plow comprising a support structure for connection to a tractor, which structure has a rearwardly extending beam on which a plow frame including a plow share carrying boom is pivotally mounted about a longitudinal turning axis and such that the boom is inclined to the beam, an arm being provided pivotally connected about a vertical axis to the support structure and extending rearwardly and longitudinally along with the boom and pivotally connected by a link at its rear part to a central region of the boom, the arm also carrying at its rear end a tail wheel support having a castor action whereby, as the plow frame is turned over by ram operation for plow reversal, opposite lateral swinging movement is imparted to the arm for providing corresponding tail wheel support of the boom alongside the latter in accordance with the operative position to which the plow frame is turned.

3,730,280

IMPLEMENT FRAME

George Frederick Oelschlaeger, Rock Island, Ill., assignor to Deere & Company, Moline, Ill.

Filed Oct. 30, 1970, Ser. No. 85,585
Int. Cl. A01b *21/08*
U.S. Cl. 172—581 **4 Claims**

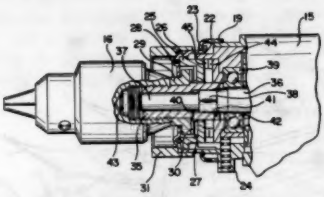


An implement frame having a plurality of individual tool gang subframes pivotally mounted medially on a main frame for horizontal swinging movement between an angled position for normal operational purposes, and a generally fore-and-aft position for transport purposes.

3,730,281
DRILL HAMMER-DRILL MECHANISM FOR POWER TOOL

John W. Wood, Baltimore, Md., assignor to The Black and Decker Manufacturing Company, Towson, Md.

Filed June 7, 1971, Ser. No. 150,339
Int. Cl. B25d 11/10; E21c 1/12
U.S. Cl. 173—48 13 Claims

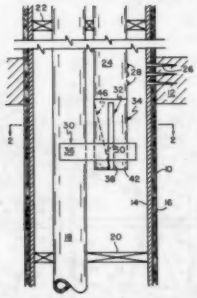


A drill:hammer-drill arrangement is provided for a portable power tool wherein the hammering teeth are located immediately adjacent the chuck portion of the tool and wherein one set of hammering teeth are carried by the shaft which drives the chuck. A spring is provided which biases the chuck and the rotational hammer teeth forwardly relative to the tool during hammering while another spring biasses the stationary teeth toward the tool. In the hammer position, operator bias overcomes the spring force to engage the teeth and relative rotation causes hammering. In shifting into the drill position, a cam surface forces the chuck and the shaft on which the hammer teeth are mounted toward the tool until the shaft engages the forward bearing on the output spindle of the tool. Thus the forward bearing takes the thrust applied against the tool by the operator during drilling and eliminates the need for an independent thrust bearing.

3,730,282
MECHANICALLY ORIENTED PERFORATING SYSTEM

Ronald W. Chapman, Metairie, La., assignor to Shell Oil Company, New York, N.Y.

Filed March 11, 1971, Ser. No. 123,344
Int. Cl. E21b 43/119
U.S. Cl. 175—4.51 17 Claims

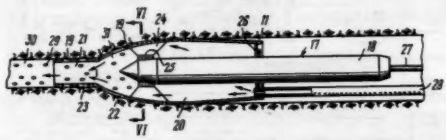


There is disclosed an apparatus for mechanically orienting a through-tubing perforating gun in a multiple completion wall for perforating an upper formation without damage to other tubing strings in the well. The apparatus comprises an inclined plane in the tubing string and an inclined plane on the perforating gun to rotate the perforating gun about the long axis thereof. The gun carried orienting plane is positioned below the perforating elements and an end of tubing locator is positioned adjacent the bottom of the orienting plane. Suitable electrical controls are provided to prevent firing of the perforating gun until the orienting surfaces are parallel and until the end of tubing locator sensibly engages the bottom of the tubing.

3,730,283
METHOD OF REAMING GROUND THROUGH HOLES AND DEVICE FOR EFFECTING SAME

Alexandr Dmitrievich Kostylev, ulitsa Derzhavina, 19, kv. 44; Konstantin Stepanovich Gurkov, ulitsa Derzhavina, 19, kv. 28; Khaim Berkovich Tkach, ulitsa Kashurnikova, 34, kv. 3; Nikolai Grigorievich Nazarov, ulitsa Gogolya, 3, kv. 10; Petr Eduardovich Malbert, ulitsa Kotovskogo, 8, kv. 7; Nikolai Sergeevich Lavrov, ulitsa Demyana Bednogo, 70, kv. 62; Jury Innokentievich Alkasarov, ulitsa Sennaya, 36, kv. 36; Nikolai Leontievich Legechev, ulitsa Vatutina, 14, kv. 17, all of Novosibirsk; Alexandr Isovich Golbinshtein, Leningradsky prospekt, 109, kv. 24, Moscow; Alexandr Mironovich Reinsburg, ulitsa Mendeleeva, 5/7, kv. 12, Odessa; Mikhail Vladimirovich Burshtein, ulitsa Pushkina, 15, kv. 10, Odessa; Dmitry Pavlovich Mikushin, ulitsa Pervomaiskaya, 6, kv. 6, Novosibirsk; Alexei Danilovich Terskov, ul. Bljukhera, 21, kv. 74, Novosibirsk, and Leonid Stepanovich Belov, ulitsa Ordzhonikidze, 49, kv. 89, Novosibirsk, all of U.S.S.R.

Filed Nov. 17, 1970, Ser. No. 90,267
Int. Cl. E21c 3/00
U.S. Cl. 175—53 5 Claims

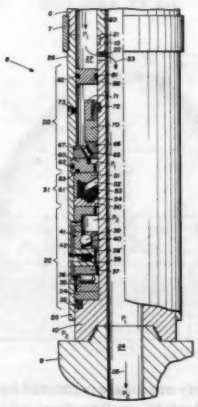


A method of reaming through holes by destroying the soil layers adjacent to the hole, and a device for effecting this method, in which the reamer is provided with means used for destroying in the hole the adjacent layers of the soil.

3,730,284
DRILLING TOOL AND BEARING SYSTEM

John H. Striegler, Richardson, Tex., assignor to Atlantic Richfield Company, New York, N.Y.

Filed July 1, 1971, Ser. No. 158,713
Int. Cl. E21b 3/08
U.S. Cl. 175—92 9 Claims



A bearing system in an annulus between a shaft and a housing comprising a seal means in the annulus and bearing means

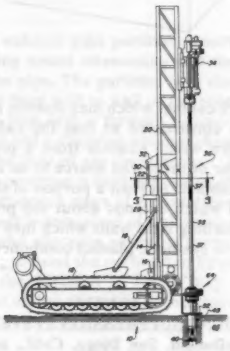
on either side of the seal means, one of the bearing means having a piston means associated therewith to provide a lubricant reservoir which is sealed from external pressures and which will vary in volume depending upon the amount of lubricant present. A downhole drilling tool employing the above bearing system together with a downhole motor operably connected to the shaft of the bearing system, the other end of the shaft being adapted to carry a drilling bit.

3,730,285

ROCK DRILL BIT GUIDE AND MAST STABILIZER

Floyd R. Anderson, 2200 Maine St., Quincy, Ill., and Donald N. Sullivan, Lakewood, Colo., assignors to Gardner-Denver Company, Quincy, Ill.

Filed Oct. 8, 1971, Ser. No. 187,703
Int. Cl. E21b *15/00*; E21c *11/00*
U.S. Cl. 175—220 **3 Claims**



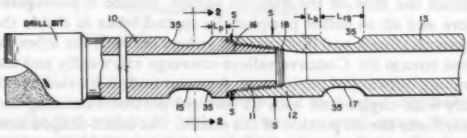
A rock drill bit guide comprising a cylindrical tubular element attached to the lower end of a drill mast and aligned with the central longitudinal axis of the drill string. The guide serves to pilot a rock drill bit during collaring of the drill hole. The bit guide also may be forced to penetrate the earth formation being drilled to act as a stabilizer or anchor for the drill mast.

3,730,286

APPARATUS FOR IMPROVING ROTARY DRILLING OPERATIONS

Peter D. Weiner, Bryan, Tex., assignor to Esso Production Research Company, Houston, Tex.

Continuation of Ser. No. 52,404, July 6, 1970, abandoned.
This application June 29, 1972, Ser. No. 267,713
Int. Cl. E21b *17/00*; E21c *15/00*
U.S. Cl. 175—320 **18 Claims**



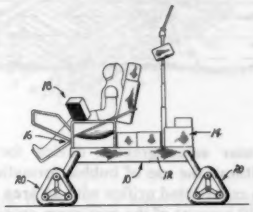
Apparatus for drilling a well bore using a rotary drill string provided with a drill collar and a drill bit on the lower end of the drill string. The drill collar has a reduced diameter annular groove formed on its exterior surface adjacent the threads on either or both the pin end and box end thereof. The amount of the reduction in diameter of each groove is such as to reduce the Moment of Inertia from about 50 to 80 percent of the original cross-section of the drill collar. The length of each groove is selected so as to minimize the stress concentration due to discontinuity produced by the change in cross-section of the drill collar while maintaining the effectiveness of the weight of the drill collar.

3,730,287

VEHICLE FOR USE IN PLANETARY EXPLORATION

James C. Fletcher, Administrator of the National Aeronautics and Space Administration with respect to an invention of, and Edward Hryniewiecki, Sherman Oaks, Calif.

Filed May 17, 1971, Ser. No. 144,139
Int. Cl. B62d *11/04*
U.S. Cl. 180—6.5 **9 Claims**



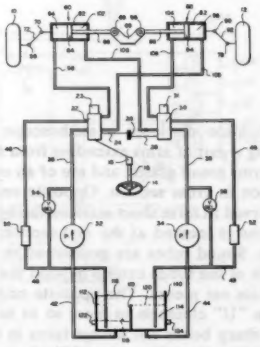
A self-propelled vehicle particularly suited for use in traversing hostile terrain. The vehicle is characterized by a plurality of mutually independently operable propulsion units, each including an extended leg coupled with the frame of the vehicle for rotation about an axis transversely related thereto and supported by a steerable pedestal having operational attributes of both a wheel and an endless track and employable for propelling the vehicle along a given surface, through a selectively operable power train functioning to drive the leg in rotation about its axis and/or activating the pedestal in a wheel-driven and/or track-laying mode of operation.

3,730,288

DUAL STEERING SYSTEM

Harold F. Dean, Woking, England, assignor to Clark Equipment Company

Filed Dec. 9, 1970, Ser. No. 96,557
Int. Cl. B62d *5/06*
U.S. Cl. 180—79.2 R **5 Claims**



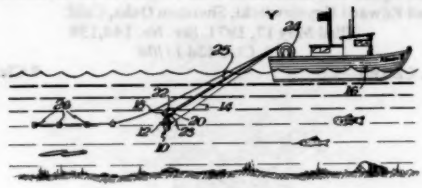
A dual fluid steering system utilizing two pumps to supply fluid to actuators which turn the wheels for steering. The control valves and other portions of the system are arranged so that each of the pumps supplies fluid to both of the actuators during normal operation whereby if one of the pumps fails, the other pump can continue to be utilized to operate both actuators and turn both of the wheels with reduced force under emergency conditions resulting from the failure of one pump.

3,730,289

SEISMOGRAPHIC DEVICE

Philip Barnhard, IV, 1062 Dunvegan Drive, West Chester, Pa.

Filed Sept. 18, 1970, Ser. No. 73,436
Int. Cl. G01v 1/06
U.S. Cl. 181—0.5 NC 14 Claims



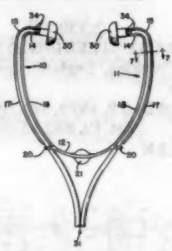
An underwater seismographic device for surveying or prospecting without the use of bubble formation comprises a vessel having a constricted orifice with an area of about 5 percent to about 20 percent of the maximum cross-sectional area of the vessel. The combustion gases escape through the orifice and the shock wave used for seismographic prospecting passes through the wall of the vessel.

3,730,290

STETHOSCOPE

Thomas Albert Scanlon, Barrington, R.I., assignor to Avid Corporation, East Providence, R.I.

Filed Aug. 18, 1972, Ser. No. 281,956
Int. Cl. A61b 7/02
U.S. Cl. 181—24 4 Claims



This specification discloses a stethoscope comprising a frame including a pair of arms extending from a medial spring section. The arms are of plastic and are of an open "U" channel construction in cross section. Opposite ends of the arms are smooth curved to form short sections facing each other. A stiffening button is located at the mid-section of the medial spring section. Sound tubes are positioned in the open "U" channels. Ends of the tubes extend beyond the short sections to accommodate ear pieces. The opposite ends of tubes exit from the open "U" channels to meet so as to form a cable. There are no sharp bends nor abrupt turns in the tubes from the point of entry into the open "U" channels to the ear pieces.

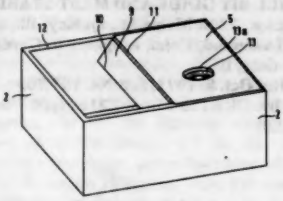
The present invention relates to stethoscopes of the type commonly employed by air line passengers for use with entertaining sound apparatus and is concerned primarily with a stethoscope which may be comfortably applied to and suspended from the ear canals of an air line passenger and which includes sound tubes that are free of sharp and abrupt turns whereby sterophonic high fidelity sound frequency is maintained from the original source of the sound.

3,730,291

SOUND SOURCE CABINETS

Helmut Goeckel, Liebenau-Weser, Germany, assignor to Neckermann Versand KGaA, Frankfurt/Main, Germany

Filed Aug. 4, 1971, Ser. No. 168,977
Claims priority, application Germany, Aug. 18, 1970, P 20 41 012.2
Int. Cl. G10k 13/00; H04r 1/28
U.S. Cl. 181—31 B 18 Claims



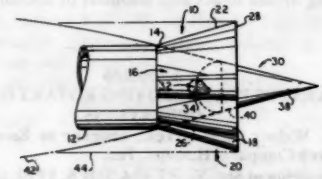
A sound source cabinet which may contain a loudspeaker as sound source is constructed so that the cabinet defines an ever-growing horn which extends from a pressure chamber located at the rear of the sound source to an aperture defined by walls of the cabinet. At least a portion of the horn is in the form of a spiral which extends about the pressure chamber and has non-absorbing rigid walls which may be for example, plywood boards or synthetic plastics components.

3,730,292

SOUND SUPPRESSION SYSTEM

Howard R. MacDonald, San Diego, Calif., assignor to Rohr Corporation, Chula Vista, Calif.

Filed Jan. 22, 1971, Ser. No. 108,918
Int. Cl. B64d 33/06
U.S. Cl. 181—33 HC 8 Claims

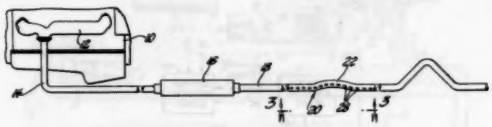


System includes a nozzle located aft of the tail pipe and connected thereto to define a discharge zone and surround and direct the flow of the gaseous stream. Nozzle is corrugated fore and aft to define peripherally spaced lobes to divide the gaseous stream and flow passage valleys between the lobes for free stream air. Concave valleys converge rearwardly and terminate outward of engine axis. A center body is located coaxially with engine and with its forward portion extending forward into the aft portion of the nozzle. The dome-shaped nose faces directly into the axial flow of the central portion of the gaseous stream and has sound absorbing surface to absorb sound waves in the gaseous stream. All or part of inner walls of lobes may be similarly treated to increase sound absorption. Location of nose is such that sound waves reflected by nose and lobes will strike opposing surfaces to further increase sound absorption. With or without sound absorbing surfaces, nose and following portion of center body may be tailored to cooperate with lobes to define convergent nozzle profile or convergent-divergent nozzle profile without requiring surfaces of double curvature in lobes.

3,730,293
EXHAUST PIPE WITH COMBINED BENDABLE PARTITION

Thomas R. Cassel, 226 Shirley, Birmingham, Mich.

Filed May 12, 1972, Ser. No. 254,355
Int. Cl. F01n 1/02, 7/18
U.S. Cl. 181—36 B 10 Claims

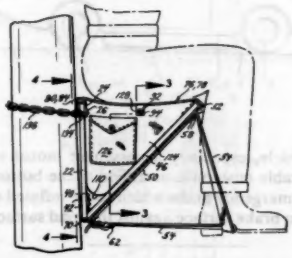


An improved exhaust pipe partition structure is disclosed for use in forming sound attenuating and thermal insulating devices inside the pipe. The partition is of sheetlike construction and extends from wall to wall of the pipe to separate the space inside the pipe into a through passage for conducting the exhaust gases and a chamber which is closed at least at one end to inhibit the flow of gas therethrough. In the improved construction the partition is held in position inside the pipe by two oppositely disposed rows of indentations in the walls of the pipe. The sheet is comprised of a plurality of longitudinally disposed zones and alternate zones are more easily yieldable to forces tending to bend the partition in its own plane so that the pipe, with the partition in place, may be bent in any direction without undue distortion of the pipe or the partition.

3,730,294
FOLDABLE, READILY-TRANSPORTABLE SEAT

James A. Thurmond, 1305 Honeywood Drive, Crestwood, Mo.

Filed Nov. 19, 1971, Ser. No. 200,381
Int. Cl. A45f 4/02
U.S. Cl. 182—20 16 Claims

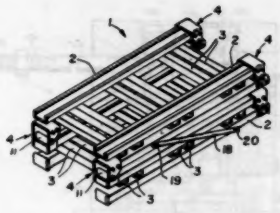


A seat includes two sub-frames which are hinged together to enable that seat to be folded to fit into a small space. Straps are secured to one of those sub-frames to pass forwardly along the front of the upper portion of the body of a user to make that seat readily transportable; and those straps can depend downwardly from that one sub-frame to act as stirrups for the feet of that user when that seat is being used to support that user. A sturdy section of flexible material extends between the upper ends of the sub-frames of the seat to constitute the supporting surface of that seat; and also to serve as a closure for a receptacle which is located between those sub-frames and which can be used to store objects while that seat is being transported or is being used to support the user.

3,730,295
FOLDABLE EXTENSION LADDER

Samuel H. Deese, 1005 Brown St., Bel Vernon, Pa.

Filed June 10, 1971, Ser. No. 151,684
Int. Cl. E06c 1/383
U.S. Cl. 182—163 3 Claims

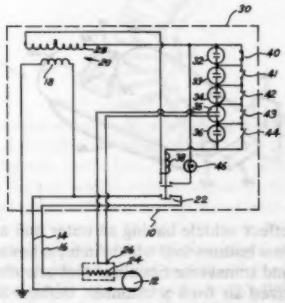


This invention relates to a foldable extension ladder of channel shaped or tubular metal comprising a plurality of side rail sections hinged together at their end portions so that when the ladder is assembled into operating position, the end of one side rail section will project into a sleeve portion of the hinge connected to an adjoining side rail section so as to be reinforced and guided thereby. The rungs have end portions pivoted to struck out portions of the side rail sections, which end portions project into the hollow side rail sections so as to be directly supported by the main panels of such side rail sections.

3,730,296
INTERLOCK SAFETY DEVICE FOR MACHINERY

Wilfred J. Huigens, Clarinda, Iowa, assignor to Lisle Corporation, Clarinda, Iowa

Filed Feb. 23, 1972, Ser. No. 228,692
Int. Cl. F16p 3/08; G08b 21/00
U.S. Cl. 192—134 2 Claims

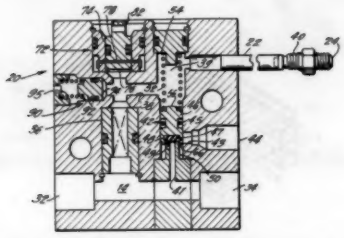


A control box interposed between the power source for a machine and a machine prevents the delivery of power to the machine until all machinery guards associated with the machine are in a closed circuit position. The control box includes a series of standard sockets, one socket associated with each machinery guard. The control device operates to open a circuit breaker in the power supply line whenever the machinery guards are open or opened.

3,730,297
LIQUID SYSTEM FUNCTION INDICATOR

Francis E. Colgan, Midland Park, and Paul H. Reeve, River Vale, both of N.J., assignors to Auto Research Corporation, Boonton, N.J.

Filed July 28, 1971, Ser. No. 166,721
Int. Cl. F16n *29/04*
U.S. Cl. 184—6.4 **20 Claims**

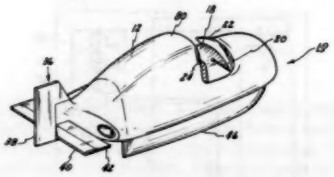


In a constant volume liquid distribution system, a means to determine which liquid outlet means in a series of outlet means connected with a main pressure line is not receiving its proportional share of liquid. This is accomplished by monitoring the relationship of a primary and a secondary pressure within some acceptable limits to detect any malfunction in the system. Each outlet means includes a branch pressure line connected with the main line and passing through a proportioning block. Each block includes a pressure responsive valve means that monitors the aforementioned pressure relationship and operates as a result of varying pressures within the block due to malfunctions anywhere between the main line and the outlet from the respective outlet means. Valve operation causes a malfunction indicator for the same block to operate. Each block includes appropriate pressure and flow control fittings for apportioning liquid among the outlet means.

3,730,298
SURFACE EFFECT VEHICLE

Arthur C. Schouw, Evart, Mich., assignor to Commute Air, Inc., Pontiac, Mich.

Filed March 2, 1971, Ser. No. 120,096
Int. Cl. B60v *1/12*
U.S. Cl. 180—126 **9 Claims**

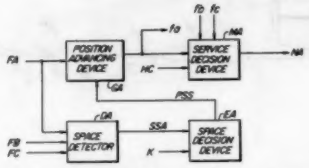


A surface effect vehicle having an outer hull and an inner hull secured to a bottom wall which, in turn, has a plurality of longitudinal and transverse openings that are adapted to exhaust pressurized air from a chamber, defined by the inner hull, downwardly from the vehicle at a rate which is sufficient to generate a force to lift the vehicle vertically. A rotatably mounted fan, carried within the inner hull and driven by a conventional engine, is adapted to draw air in through the outer hull and direct pressurized air through the openings. Longitudinal and transverse flaps respectively, pivotally mounted adjacent the bottom wall longitudinal and transverse openings, are adapted to be selectively manipulated to control the direction of the flow of pressurized air exhausted through the openings to selectively drive the vehicle forwardly or rearwardly.

3,730,299
ELEVATOR CONTROL SYSTEM

Isao Inuzuka; Kikuo Watanabe; Takeo Yuminaka; Tatsuo Iwasaka, all of Katsuta, and Toshio Ochi, Hitachi, all of Japan, assignors to Kitachi, Ltd., Tokyo, Japan

Filed Oct. 20, 1970, Ser. No. 82,476
Claims priority, application Japan, Oct. 24, 1969, 44/84719; Dec. 8, 1969, 44/97882; Dec. 8, 1969, 44/97883
Int. Cl. B66b *1/20*
U.S. Cl. 187—29 R **12 Claims**

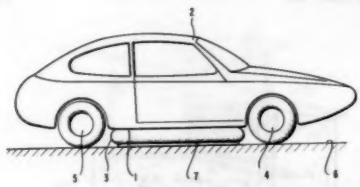


In a plurality of elevator cars serving a plurality of floor landings, an elevator control system in which the response of a preceding car to hall calls from predetermined forward floors is limited when the space between said preceding car and a succeeding car is shortened.

3,730,300
MOTOR VEHICLE

Hans O. Scherenberg, Stuttgart 71, Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart-Untertuerkheim, Germany

Filed April 27, 1971, Ser. No. 137,796
Claims priority, application Germany, April 28, 1970, P 20 20 679.5
Int. Cl. B60t *1/14*
U.S. Cl. 188—5 **23 Claims**



A motor vehicle, especially a passenger motor vehicle in which an inflatable cushion is arranged at the bottom side of the vehicle as emergency brake which in the inflated condition is pressed with a brake surface against the road surface.

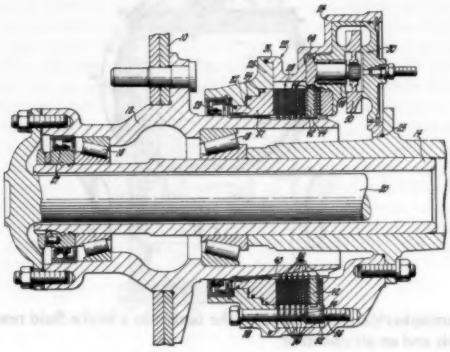
3,730,301
TEMPERATURE RESPONSIVE PUMP DRIVE MECHANISM

Burnette Heck, Bloomfield Hills, and Donald W. Reynolds, Detroit, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Sept. 15, 1971, Ser. No. 180,806
Int. Cl. F16d *65/84*
U.S. Cl. 188—71.6 **1 Claim**

A liquid cooled disk brake includes a series of friction disks splined to the rotating wheel hub and interleaved rotationally stationary friction disks splined to the brake housing, one of the stationary disks being replaced by a gear rotatable with respect to both the brake housing and the hub and positioned between two of the rotating disks for rotation therewith to

drive a brake coolant circulating pump when the disk pack is compressed for braking the rotation of the wheel. A temperature responsive bimetallic clip engages the two stationary disks adjacent the two rotating disks juxtaposed to the pump



drive disk and forces the rotating disks into clutching engagement with the pump drive disk to drive the coolant pump irrespective of disk pack actuation when the temperature exceeds a predetermined level.

3,730,302

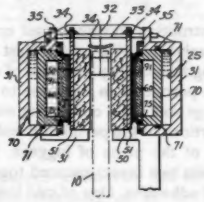
DISC BRAKE INCLUDING VIBRATION DAMPENING MEANS

Tokuo Ogawa, 1-82, Umeta-cho, Tsushima-shi; Tatsumi Sakano, 9-117-2, Nakamura-cho, Nakamura-ku, Nagoya-shi, and Shigeyoshi Okamura, 15-7, Choshida, Nagakuwa, Nagokute-mura, Aichi-gun, all of Japan

Division of Ser. No. 33,707, May 1, 1970, Pat. No. 3,684,061. This application May 19, 1972, Ser. No. 254,946

Int. Cl. F16d *65/02*

U.S. Cl. 188—73.5 **10 Claims**



A disc brake of simple construction wherein an intermediate member such as a metal powder sintered product retaining lubricating material such as oils and fats is provided between the pad and the piston, and a protecting cover is fitted over said intermediate member to prevent the leakage of said lubricating material and to retain the lubricating material for a long time. The protecting cover slides with the pad, or piston, relative to the porous intermediate member during braking, while the intermediate member reduces the frictional force between opposed surfaces of the pad and the piston thus preventing brake squeal.

3,730,303

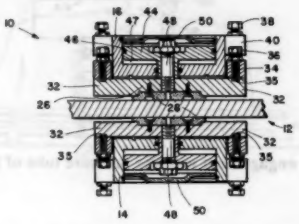
PARKING BRAKE, SPRING APPLIED, HYDRAULIC RELEASED

Carl E. Bricker, Cuyahoga Falls, and Kenneth P. Hillegass, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jan. 4, 1971, Ser. No. 103,732

Int. Cl. F16d *65/24*

U.S. Cl. 188—170 **9 Claims**



An emergency or parking brake for a motorized wheel vehicle. Friction pads are carried in aligned relationship on opposite sides of a rotating disc. The pads are mounted on plates and a pair of U-shaped springs engage the edges of the plates to force the plates and pads into clamping relation with the disc. The mounting plates are also connected to pistons. When hydraulic pressure is present the pistons counter the spring forces and hold the friction pads away from the discs.

3,730,304

FABRICATED RING FOR A BRAKE DISK

Edwin K. Buyze, Philadelphia, Pa., assignor to The Budd Company, Philadelphia, Pa.

Filed May 26, 1971, Ser. No. 146,937

Int. Cl. F16d *65/12*

U.S. Cl. 188—218 XL **3 Claims**

A lighter, less expensive and more easily assembled brake ring for a vehicle disk brake system having a pair of brake plates held in spaced relationship by a plurality of rib structures.

3,730,305

SHOCK ABSORBER PISTON

Norman G. Fouts, Belleville, Mich., assignor to Ford Motor Company, Dearborn, Mich.

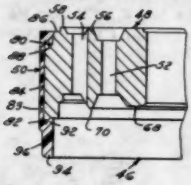
Filed April 16, 1971, Ser. No. 134,570

Int. Cl. F16f *9/32*

U.S. Cl. 188—322 **6 Claims**

A telescopic hydraulic shock absorber for a motor vehicle has a piston of composite construction. The composite piston

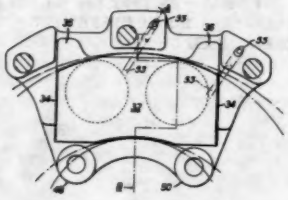
includes a metal core that is ported to provide jounce and rebound flow passages and a plastic peripheral surface that is in slidable engagement with the pressure tube of the shock absorber.



3,730,306
DISC BRAKE CALIPER AND CIRCUIT SYSTEM

Heinrich Bernhard Rath, Birmingham, England, assignor to Girling Limited, Tyseley, Birmingham, England

Division of Ser. No. 808,066, March 18, 1969, abandoned. This application Feb. 25, 1971, Ser. No. 118,961
Claims priority, application Great Britain, April 6, 1968, 16,635/68
Int. Cl. B60t *11/16*
U.S. Cl. 188—345 3 Claims



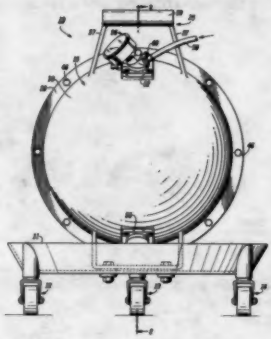
A vehicle disc brake comprising a caliper structure formed in two opposed halves a bridge portion straddling the disc and having a central bridge section and two side bridge sections, each of which defines with said central section a pad inspection window in said bridge portion. Two side-by-side pistons and cylinders in each caliper half are each aligned with an opposed cylinder in the other caliper half. Passage means interconnect two cylinders of each opposed pair, one said passage means extending through the central bridge section and the other passage means extending through one of the side bridge sections.

3,730,307
HYDRAULIC BRAKE SYSTEM BLEEDER

Wallace F. Mitchell, Arlington Heights, Ill., assignor to Ammco Tools Inc., Chicago, Ill.

Filed Oct. 4, 1971, Ser. No. 186,320
Int. Cl. B60t *17/00*
U.S. Cl. 188—352 6 Claims

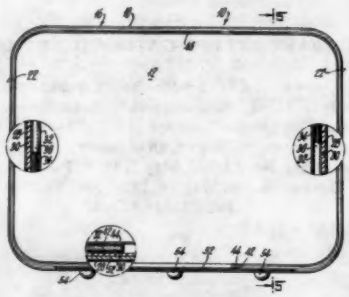
A portable, pressurizable brake bleeder includes a spherical pressure tank formed of a pair of identical castings each lined with a removable sealing member, and a flexible diaphragm of hemispherical shape dividing the tank into a brake fluid reservoir and an air chamber.



3,730,308
LUGGAGE CONSTRUCTION

Joseph Y. Pelavin, North Bergen, N.J., assignor to Lark Luggage Corporation, New York, N.Y.

Filed June 14, 1971, Ser. No. 152,847
Int. Cl. A45c *3/00*
U.S. Cl. 190—41 R 14 Claims



A luggage construction having a coil spring of predetermined length loosely mounted on at least one flexible wall thereof so that longitudinal displacement of at least one end of said coil spring is permitted in response to certain deformations of said luggage wall. Said coil spring may extend longitudinally around portions of the peripheral wall defining the top, bottom and ends of the piece of luggage. Said flexible wall may include at least two layers secured together by stitching without the use of adhesives. One of said layers may be a nonwoven fabric impregnated with an elastomeric polymer.

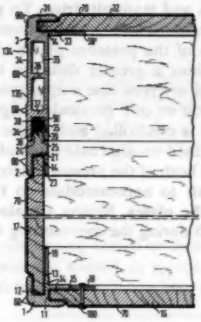
3,730,309
SUITCASE

Klaus Hamann, 8191 Hohenrain, and Jurgen Hamann, 8033 Krailling, both of Germany, assignors to Rox-Lederwarenfabriken Hamann KG, Munich, Germany

Filed July 19, 1971, Ser. No. 164,156
Claims priority, application Germany, July 30, 1970, G 70 28 787.5
Int. Cl. A45c *13/04*
U.S. Cl. 190—49 8 Claims

A suitcase essentially consisting of frames of extruded light metal and planar panels of rigid wood is assembled by edges of

the panel members being adhesively fastened in elongated grooves of the frames, one side wall of each groove being provided with integral, longitudinal ribs. The ribs mechanically



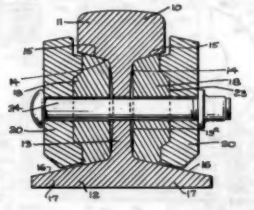
interlock with the adhesive layer and prevent the adhesive from being released from the frame under unfavorable conditions.

3,730,310

CURRENT CONDUCTOR RAIL

Arthur James Spiringer, Lynchburg, Va., assignor to H. K. Porter Company, Inc., Lynchburg, Va.

Filed Sept. 30, 1971, Ser. No. 185,100
Int. Cl. B60m *1/30*
U.S. Cl. 191—29 DM **6 Claims**



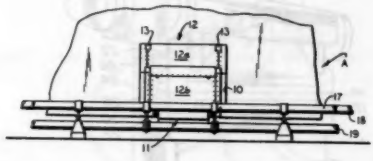
An electrical current conductor rail in the form of a high strength beam of ferrous metal of "H" or "I" transverse cross-section providing longitudinally extending outwardly presenting channels on opposite sides of the beam, one or both of which channels have rigidly secured therein a non-ferrous metal extrusion of high electrical conductivity coextensive in length with that of the beam. The extrusion is provided along its full length with an outwardly presenting protuberance serving as a key for coaction with a complementally shaped splice plate for end to end coupling of a pair of such rails. Additionally the body of each extrusion is so shaped relatively to its supporting beam that when secured to the latter the central portion thereof coextensive with said protuberance may be sprung toward the central web of the beam to insure maximum electrical contact between the engaging surfaces of the beam and its extrusion.

3,730,311

COLLECTOR SLED AND MOUNTING STRUCTURE THEREFOR FOR HIGH SPEED, TRACK MOUNTED ELECTRIC VEHICLE

Richard L. Maison, San Diego, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

Filed March 10, 1971, Ser. No. 122,729
Int. Cl. B60l *5/38*
U.S. Cl. 191—49 **10 Claims**



A collector sled for a high speed, track mounted, electrically propelled vehicle is of a size to fit slidably within the space defined by three electrically charged rails mounted alongside a track for such vehicle. The sled is provided with three sets of collector brushes which are spring biased into wiping electrical contact, one set with each of the rails.

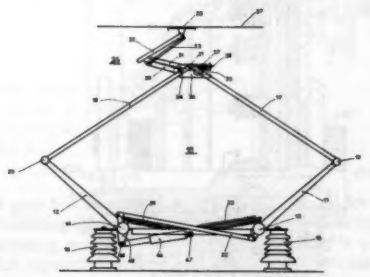
The sled is towed on the outer end of an articulated, spring balanced, two part support, extensibly mounted in a sled-receiving recess provided in a side of a vehicle. The sled is stowable in the recess, and in stowed position a portion of the sled support structure closes off the recess. A closure panel is hingedly mounted on an edge of the recess and swings out to close the recess when the sled is deployed. This closure panel also swings inwardly to admit the sled and its support for stowing.

3,730,312

METHOD AND APPARATUS FOR TRANSFERRING ELECTRICAL ENERGY TO HIGH SPEED APPARATUS

Roland E. Leger, 80 Boulevard Magenta, Paris, France

Filed July 28, 1970, Ser. No. 58,971
Claims priority, application France, July 31, 1969, 6926435
Int. Cl. B60l *5/24*
U.S. Cl. 191—66 **20 Claims**



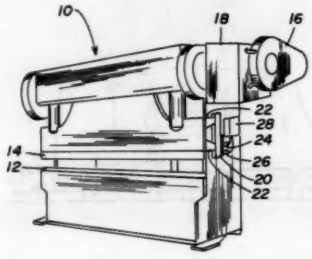
An electrical pickup to be carried by a high speed vehicle for transferring energy from a catenary system to the vehicle. The apparatus includes two separate structures which separately accommodate high frequency, low amplitude displacements and low frequency, high amplitude displacements between the high speed vehicle and a moving bow which is carried by the vehicle and slides on the catenary.

3,730,313

CONTROL SYSTEM FOR A PLURAL SPEED PRESS

Kurt K. Luenser, De Soto, Tex., assignor to Verson Allsteel Press Company, Dallas, Tex.

Filed May 3, 1971, Ser. No. 139,729
Int. Cl. F16d 67/04; F16p 3/00
U.S. Cl. 192—12 C 15 Claims



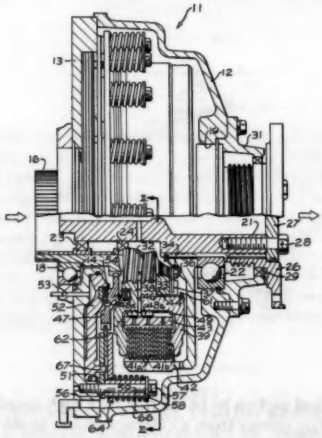
The specification discloses a control system for a press machine having fast and slow speed clutches and a brake. Three fluid valves are selectively operable to direct pressurized fluid to either the brake or fast and slow speed clutches. A first switch is operable by the press ram when the press machine is operating at a fast speed in order to switch the fluid valves to engage the brake and to disengage both the fast and slow speed clutches. A second switch is operable after the first switch in order to switch two of the valves to disengage the brake and to engage the slow speed clutch. Switches are provided to detect the operational states of the fluid valves in order to detect malfunctions thereof.

3,730,314

TRANSMISSION OUTPUT CLUTCH WITH CONDITIONAL OVERRUNNING CAPABILITY

Charles H. Herr, and Alexander C. McIntosh, both of Peoria, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 3, 1971, Ser. No. 177,670
Int. Cl. F16d 67/04
U.S. Cl. 192—18 A 5 Claims



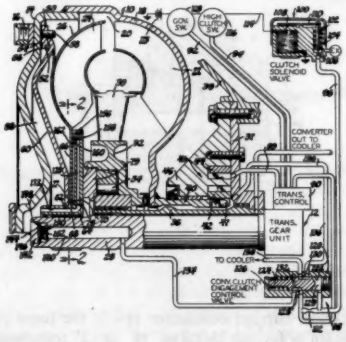
A clutch for use at the output end of a vehicle transmission in which gears are braked to a stop to facilitate shifting transmits drive in either direction except when a shift is being made at which time an overrunning action is provided. A pair of annular pressure plates engage helical splines on the shaft which connects to the transmission and a series of clutch discs are disposed between the two pressure plates with alternate ones being coupled to the output shaft whereby rotation in either direction normally urges the pressure plates together to compress the clutch discs and transmit drive. To provide the alternate overrunning mode, a fluid pressure controlled piston is shifted to enable one of the pressure plates to travel axially along the helical splines a greater distance than the other clutch plate can travel whereby disc compression occurs only in response to rotation in one particular angular direction. Pressure on the discs is controlled and torque is transmitted thereto by a gear splined to alternate ones of the discs and which is engaged with both of the pressure plates by teeth having sufficient backlash to accommodate to the differential axial movements of the plates. Means are also provided for braking the input shaft during the overrunning mode of operation.

3,730,315

HYDRODYNAMIC DEVICE WITH SLIPPING MECHANICAL CLUTCH

Robert E. Annis, Howell, and Forrest R. Cheek, Detroit, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed July 30, 1971, Ser. No. 167,655
Int. Cl. F16d 47/06
U.S. Cl. 192—3.3 4 Claims

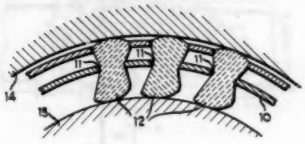


A hydrodynamic device having an impeller, a turbine and a clutch for providing a slipping mechanical drive between the turbine and impeller in addition to the normal hydraulic drive therebetween wherein the clutch is engaged with fluid pressure derived from the pressure within the hydrodynamic device and is controlled by a valve operated by thrust on the turbine to maintain a constant speed differential between the turbine and impeller regardless of input torque.

3,730,316
ONE-WAY CLUTCH

George A. Zimmer, Ithaca, N.Y., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed April 30, 1971, Ser. No. 139,073
Int. Cl. F16d *41/07, 13/60*
U.S. Cl. 192—41 A 8 Claims

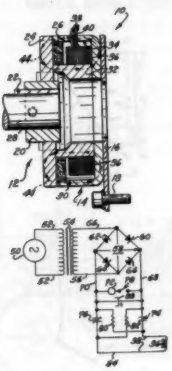


A one-way overrunning clutch or freewheel provided with clamping-components, known as sprags, cams and the like, made of ceramic material, such as a high alumina ceramic.

3,730,317
ELECTROMAGNETIC COUPLING WITH PERMANENT MAGNETS

Ralph L. Jaeschke, Kenosha, Wis., assignor to Eaton Corporation, Cleveland, Ohio

Filed July 21, 1971, Ser. No. 164,722
Int. Cl. F16d *27/06*
U.S. Cl. 192—84 R 10 Claims

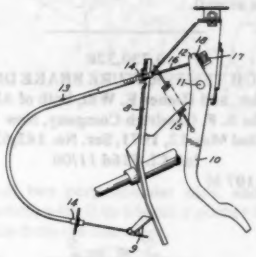


A magnetic coupling comprises an armature assembly having an armature plate formed of a material which is readily magnetizable to a first polarity and a second polarity opposite from the first polarity, a pole assembly, a coil energizable to magnetize the armature plate to its first polarity and to its second polarity, a power supply for energizing the coil and means for energizing the coil to a first polarity upon deenergization of the power supply. Energization of the coil to the first polarity effects magnetization of the armature plate to its first polarity to effect engagement of the armature plate and friction material disposed on the pole assembly. Energization of the coil to a second polarity is operable to effect demagnetization of the armature plate to its second polarity to effect disengagement of the armature plate and the friction material of the pole assembly. The means for energizing the coil to its first polarity upon deenergization of the power supply includes an energy storage means which provides a fail-safe mode of operation to insure that the armature plate engages with the friction material of the pole assembly upon deenergization of the coil by the power supply.

3,730,318
DEVICE FOR CONNECTING A CABLE TO A LEVER

John W. A. Camp, Colchester, England, assignor to Ford Motor Company, Dearborn, Mich.

Filed March 29, 1971, Ser. No. 128,790
Claims priority, application Great Britain, April 11, 1970, 17,332/70
Int. Cl. F16d *19/00*
U.S. Cl. 192—99 S 9 Claims

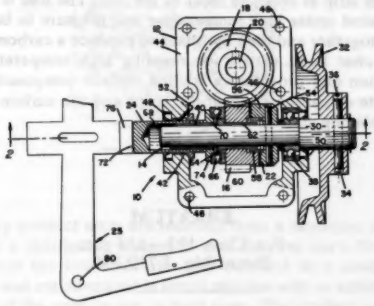


A device for connecting a cable to a lever comprising a retaining member having an arcuate bearing surface and a cable having a flat head connected to its end. The flat head on the end of the cable is rockable on the arcuate retaining member surface whereby the cable end pivots with respect to the lever as the lever is pivoted.

3,730,319
GEAR BOX AND CLUTCH ASSEMBLY

Hendrick Van der Aa, Pierre Fonds, Canada, assignor to Arlen Mills Inc., Montreal, Quebec, Canada

Filed Feb. 23, 1971, Ser. No. 117,887
Claims priority, application Canada, June 11, 1970, 085,233
Int. Cl. F16d *19/00*
U.S. Cl. 192—95 4 Claims



A gear box and clutch assembly is described for selectively transmitting a torque from a source of power to a main shaft of a braiding machine. The gear box contains a pulley shaft which supports a driving gear and a clutch mechanism, and a driven gear is supported on the main shaft in engagement with the driving gear. This driving gear is movable relative to the pulley shaft to engage the clutch mechanism thus enabling the braiding machine to be drivingly coupled to the source of power. An actuator device is provided which is movable coaxially of the pulley shaft in order to bring the driving gear into engagement with the clutch mechanism. This actuator device preferably comprises a cylindrical body member that has a blind borehole coaxially of the same. The borehole is adapted to rotatably support one end of the pulley shaft and is of a depth sufficient to accommodate the movement of the actua-

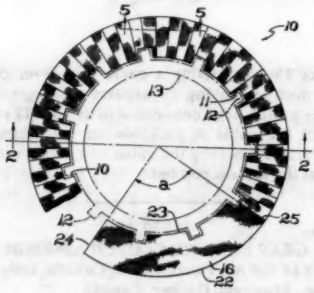
tor device which effects engagement of the driving gear and clutch mechanism. It is also preferable that the actuator device be provided with a thrust bearing thereon which engages one face of the driving gear at several points concentrically thereof, in order to uniformly restrain a load on this gear. In this way, elimination of an eccentrically applied load to the driving gear is achieved. As a result excessive wear and premature failure of the driving gear can be successfully avoided. Although specifically described with reference to a braiding machine, the present gearbox and clutch assembly could be used elsewhere as well.

3,730,320

HIGH TEMPERATURE BRAKE DISC

Herman Freeder, and Homer E. Wilt, both of Akron, Ohio, assignors to The B. F. Goodrich Company, New York, N.Y.

Filed May 12, 1971, Ser. No. 142,621
Int. Cl. F16d *11/00*
U.S. Cl. 192—107 M **4 Claims**



An annular disc for brakes or clutches in which segmented strips of resin impregnated carbon or graphite cloth are assembled in a partially overlapping relationship with opposite ends of each strip at opposite faces of the disc. The disc is formed and cured under high temperature and pressure to bond the strips together and then pyrolized to produce a carbon or graphite char bond matrix for resisting high temperatures of operation and providing a friction surface composed of the graphite or carbon cloth of the strips and the carbon or graphite binding material between strips.

ERRATUM

For Class 192—134 see:
Patent No. 3,730,296

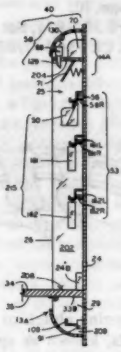
3,730,321

COIN OPERATED IRONING BOARD WITH SAFETY AND RETURN FEATURES

Minnie Izetta Akin, Levelland, Tex., assignor to Penny Enterprises, Ltd., Levelland, Tex.

Filed Jan. 21, 1971, Ser. No. 108,423
Int. Cl. G07f *5/10*
U.S. Cl. 194—9 T **8 Claims**

Apparatus and process providing one or more electrically powered implements on a short term rental basis for use in a limited area by retaining such implement or implements in an enclosure therefor, opening the enclosure and providing power to actuate the implements on insertion of a coin into a coin collector assembly and then permitting use of one or more said implements for a predetermined time and, after such use of one or more of said implements, discontinuing power connection to the implements, and, after the implements are returned to their proper place and the enclosure is closed, dispensing a coin to the user of the implements.



3,730,322

CHANGEABLE TYPE HEADS AND CHANGEABLE KEY CAPS

Lloyd E. Hare, West Hartford, Conn., assignor to Litton Business Systems, Inc., New York, N.Y.

Filed March 24, 1970, Ser. No. 22,177
Int. Cl. B41j *1/04*
U.S. Cl. 197—36 **1 Claim**

Type elements bearing special types thereon are constructed for snap-on application onto a type lever in a manner so that any such type head, when applied, becomes solidly secure on the type lever, except in a direction counter to that in which centrifugal force tends to have a throw-off effect thereon. Flexibly displaceable means allow the type heads to be readily moved into and out of applied position. In conformance with the applicable type heads, there are character bearing caps adapted to be snapped onto and off type keys.

3,730,323

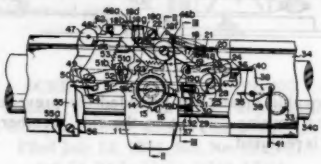
REPEAT SPACING MECHANISM FOR TYPEWRITERS

Tomoyoshi Watanabe, Hekikai-gun, Aichi-ken, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Miguho-ku, Nagoya-shi, Japan

Filed Aug. 4, 1970, Ser. No. 60,912
Claims priority, application Japan, Aug. 4, 1969, 44/61917
Int. Cl. B41j *19/00*
U.S. Cl. 197—82 **2 Claims**

A repeat spacing mechanism for typewriters, particularly manual typewriters, comprising an escapement mechanism in-

cluding an escapement wheel and a pair of pawls cooperating therewith; and a repeat spacing key connected through a spring to a rockable lever having a weight attached to its free end and normally biased to an inoperable position to release



the escapement mechanism, whereby, upon depression of the repeat spacing key, the lever is moved to an operable position by the spring to actuate the escapement mechanism, causing a carriage to perform a repeat spacing movement at a speed predetermined by the weight.

3,730,324

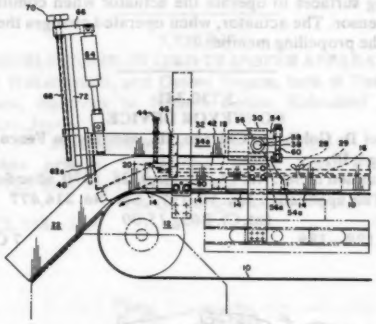
BOTTLE ESCAPEMENT DEVICE

Burton Robert Garrett, 131-12 232 St., Laurelton, N.Y.

Continuation of Ser. No. 116,689, Feb. 9, 1971, abandoned. This application June 18, 1971, Ser. No. 154,349

Int. Cl. B65g *47/00*

U.S. Cl. 198—24 **9 Claims**



A bottle escapement features a conveyor belt that carries the bottles until they hit a stop plate carried by an outer U-shaped bracket. At a selected time, a pneumatic cylinder is actuated to depress a kicker plate mounted on an inner U-shaped bracket to force a bottle below the stop plate and then down an output chute.

3,730,325

APPARATUS FOR EJECTING MISALIGNED ARTICLES

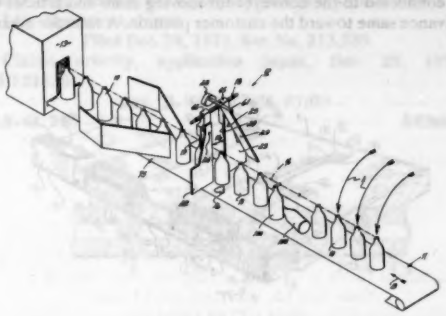
Robert C. Goodwin, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio

Filed Jan. 24, 1972, Ser. No. 220,032

Int. Cl. B65g *47/24*; B07c *5/34*

U.S. Cl. 198—33 R **16 Claims**

Apparatus for sensing and removing articles which are not within a predetermined zone of alignment on a conveyor. A pair of spaced gates present a doorway between them that defines the alignment zone. Each gate is mounted for swinging



movement about two perpendicular axes, and responds to contact of an article with it to trigger a pusher that ejects the out-of-line article from the conveyor.

3,730,326

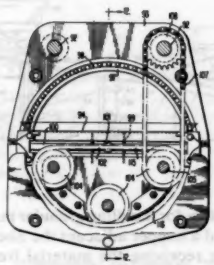
BAKERY PRODUCT TURN OVER APPARATUS

Frank M. Irving, Jr., York; Albert S. Schmidt, Sr., Wormleysburg; Ronald G. Andrus, Wrightsville, and Herbert J. P. Beckius, York, all of Pa., assignors to Alto Company, York, Pa.

Division of Ser. No. 732,179, May 27, 1968, Pat. No. 3,596,747. This application Aug. 2, 1971, Ser. No. 168,046

Int. Cl. B65g *7/00*

U.S. Cl. 198—33 AD **3 Claims**



Bakery product units are received from a depanner and/or slicer at a marshaling station in two discrete rows. Product units from the two rows are then released in a controlled manner and are advanced in timed relation with or without inversion of the units in one or both rows. The product units in one row move gradually into superposed relation with corresponding product units of the second row and each superposed pair of product units is then engaged and advanced in unison until stacked registering relationship of each superposed pair is attained.

3,730,327

MERCHANDISING AID

Edgar M. Lieberman, Kansas City, Mo., assignor to Mar-Con, Inc., North Kansas City, Mo.

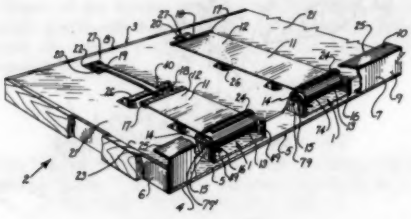
Filed Sept. 30, 1971, Ser. No. 185,153

Int. Cl. B65g *43/08*

U.S. Cl. 198—37 **14 Claims**

A merchandising aid for use on or as a shelf for storing and displaying articles of merchandise and moving same forward to an advanced position as the articles are removed therefrom

including a support with an article conveyor thereon having an upper run for support of articles. A power means is operatively connected to the conveyor for moving same and articles to advance same toward the customer position. A retarder means



is connected relative to the conveyor and operatable to limit the rate of travel thereof and an abutment member is engaged by an article when in advanced position to operate a brake means to stop the movement of the conveyor.

3,730,328

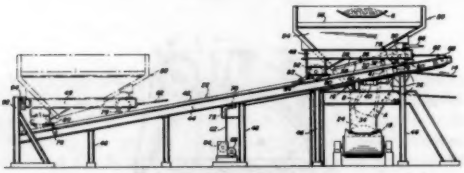
CONVEYOR SYSTEM

Richard F. Heier, Jr., Lansing, Ill., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Dec. 10, 1971, Ser. No. 206,763

Int. Cl. B65g *47/42*

U.S. Cl. 198—44 **9 Claims**



A conveyor system for handling granular material includes a first conveyor, and a hopper adjacent the discharge end of the first conveyor for receiving the material from the first conveyor and delivering it to a second conveyor. The top surface of the hopper slopes downwardly away from the first conveyor and a hopper extension having its bottom also sloping downwardly away from the first conveyor is mounted on a track sloping downwardly from the first conveyor. The top of the hopper extension is substantially larger than the top of the hopper.

3,730,329

ROLLER TABLE

Clifford Sturdy, Chesterfield; Harold Hoole, Hathersage, and Geoffrey Douglas Hill, Sheffield, all of England, assignors to Davy and United Engineering Company Limited, Sheffield, Yorkshire, England

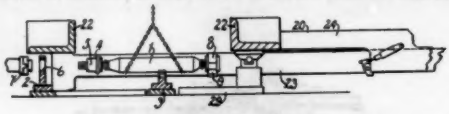
Filed June 3, 1971, Ser. No. 149,597

Claims priority, application Great Britain, June 11, 1970, 28,265/70

Int. Cl. B65g *13/02*

U.S. Cl. 198—127 R **6 Claims**

A roller table has first and second spaced apart elongate side members and a plurality of rollers carried by the side members. Each roller has bearing assemblies adjacent its ends and one of the bearing assemblies on each roller is in the form of a housing which is slideably mounted in a side member. The housing is slideable parallel to the longitudinal axis of the roller to allow the roller to be removed from the side mem-



bers. Removable means are provided for preventing movement of the housing relative to the side member until this movement is required.

3,730,330

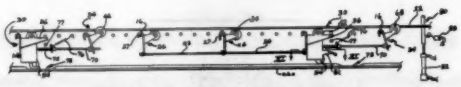
SENSOR LOCKING ACCUMULATOR

Maynard J. De Good, Grand Rapids, Mich., assignor to Rapistan Incorporated, Grand Rapids, Mich.

Filed Aug. 6, 1971, Ser. No. 169,777

Int. Cl. B65g *13/02*

U.S. Cl. 198—127 R **11 Claims**



In accumulating conveyors of the type in which the application and release of the propelling force is effected through changes in the vertical position of the propelling member, a sensor responsive to the pressure of an article conditions an actuator which in turn is connected to the propelling member support mechanisms. The propelling member has a ribbed portion along its length, which rib is provided with a series of camming surfaces to operate the actuator when conditioned by the sensor. The actuator, when operated changes the position of the propelling member.

3,730,331

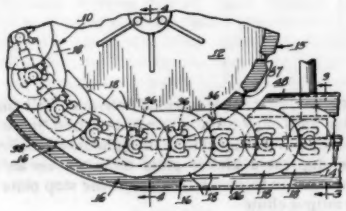
CONVEYOR DEVICE

Nathaniel D. Goldberg, Chicago, Ill., assignor to Fenco, Inc., Chicago, Ill.

Continuation of Ser. No. 75,349, Sept. 25, 1970, abandoned. This application Jan. 10, 1972, Ser. No. 216,477

Int. Cl. B65g *15/00*

U.S. Cl. 198—189 **7 Claims**



The present invention relates generally to improvements in conveyor devices and more particularly to chain type conveyor mechanisms adapted to convey articles along paths which are both straight and curved. The embodiment of the invention disclosed herein contemplates link means or members having upwardly facing surface sections for supporting an article to be conveyed. Each link includes universal type coupling means for connecting a link member to an adjacent

complementary link member and also means for accommodating the periphery of complementary sprockets. The axis of one sprocket is substantially vertical and the axis of the other is substantially horizontal. The upper side of the sprockets rotatable about the vertical axis are positioned beneath the upwardly facing surface sections so as to counteract tendencies for said sections to tilt as they move along the aforesaid curved path.

3,730,332

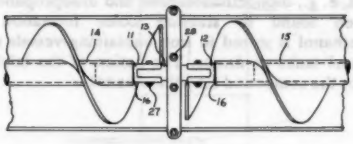
SCREW CONVEYOR COUPLING

Robert O. Benzon, 102 E. South Street, and Richard K. Dybdal, 402 W. Center Street, both of Cambridge, Ill.

Filed July 15, 1971, Ser. No. 162,907

Int. Cl. B65g *33/32*; **E21b** *17/02*

U.S. Cl. 198—213 **1 Claim**



A pair of interlocking coupling faces permits removal of a central bearing portion of a coupling in a direction perpendicular to the axis of conveyor screws. Each of two similar cylindrical end pieces of the coupling is secured within one of the adjacent ends of hollow conveyor screw shafts, and the outer ends of the end pieces have deep, wide slots that receive mating tongues of the ends of the central bearing portion. The bifurcated ends of the end pieces and the tongues are long enough to have bolts pass through them, but the bolts need merely to resist lateral displacement of the central portion because the driving torque is transmitted by the tongues.

3,730,333

DOUBLE-COMB-SHAPED TRANSFER APPARATUS

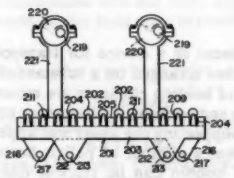
Ikuzo Wakabayashi, and Osamu Nagata, both of Yokohama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed April 21, 1971, Ser. No. 135,910

Claims priority, application Japan, Sept. 21, 1970, 45/82185; Sept. 21, 1970, 45/82186

Int. Cl. B65g *25/04*

U.S. Cl. 198—219 **7 Claims**



Transfer apparatus for continuously transferring an elongated article comprises a central segment having two spaced apart parallel rows of comb-shaped projections of uniform pitch, outer segments on both sides of the central segment and having similar projections, the projections of the central and outer segments receiving the article in the notches formed between their projections and a crank mechanism for imparting a circular motion to the outer segments, the crank mechanism having a predetermined eccentricity related to the pitch of the projections.

3,730,334

ENVELOPE FOR PHOTOSENSITIVE MATERIAL

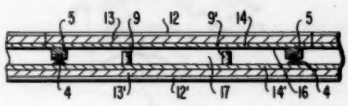
Akira Tsuji, Kanagawa, Japan, assignor to Fiji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 29, 1971, Ser. No. 213,539

Claims priority, application Japan, Dec. 29, 1970, 45/121439

Int. Cl. B65d *27/06*, *85/00*

U.S. Cl. 206—1 R **3 Claims**



An envelope for storing, handling and mailing of photographic film is formed from two sheets of material sealed together along three sides. The inner surface is provided with a moisture barrier layer having plastic fasteners define a substantially rectangular volume in the envelope for the reception of the film. One sealed edge of the envelope may be removed along a perforated line to enable the plastic fasteners to be separated for removal of the film.

3,730,335

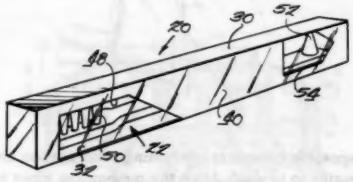
CARTON

Emanuel B. Tarrson, 400 East Randolph Street, Chicago, Ill.

Filed Oct. 30, 1970, Ser. No. 85,424

Int. Cl. B65d *5/44*, *25/54*

U.S. Cl. 206—45.31 **8 Claims**



A carton for containing an article with an elongated member, the carton comprising a pair of side panels, a rear panel connected to the side panels, and a face panel connected to the side panels and having a cut-out portion therein, which is folded inwardly of said carton and frictionally engages the rear panel to form a barrier. The cut-out portion is spaced from one of the side panels so as to create an opening in the barrier through which the elongated member of the article may be inserted and retained in place. The carton is also provided with means for closing openings at the opposite ends of the carton.

3,730,336

PACKAGED LIQUID CONTAINERS

Alter Feldman, 36 Shevat Zion St., Tel-Aviv, Israel

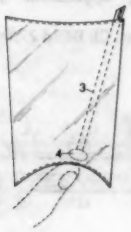
Filed Feb. 16, 1970, Ser. No. 11,552

Int. Cl. B65d *83/00*

U.S. Cl. 206—47 B **6 Claims**

A packaged liquid container comprises a closed flexible plastic bag, a liquid within the closed bag, and an emptying tube completely disposed within the closed bag and having an end able to pierce the wall of the bag from the inside, for emptying the liquid from the bag. In one disclosed form, particularly for containing beverages, the emptying tube is a drinking tube, preferably in the form of a drinking straw removably at-

tached to a bead. The bead may be formed with one or more recesses and projections enabling a plurality of them, after their respective bags have been emptied and the beads

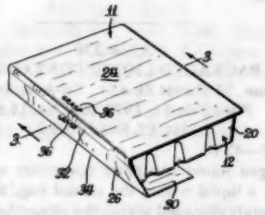


removed, to be assembled together for amusement purposes. In other disclosed forms, useful for liquids to be poured out of the container, the emptying device is a funnel or a bullet-shaped pouring spout.

3,730,337
ASPRIN-CAPRI OR TAB-CAPRI
Melvin White, 3305 Grape St., Denver, Colo.
Filed Nov. 4, 1970, Ser. No. 86,718
Int. Cl. B65d *81/32, 85/56, 75/42*
U.S. Cl. 206—47 B **1 Claim**

A disposable container containing a medication and a quantity of water so to wash down the medication when a person is attempting to swallow the medication, and the container enclosing the medication and the water in separated compartments from each other.

3,730,338
STERILE SHIELDED CONTAINER
Sheldon R. Chesky, Rolling Meadows, Ill., assignor to The Kendall Company, Boston, Mass.
Filed March 4, 1971, Ser. No. 121,080
Int. Cl. A61b *19/02*; **A61l** *15/00*
U.S. Cl. 206—63.2 R **13 Claims**

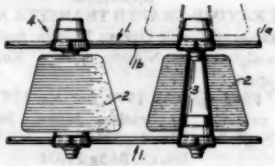


A shield for a hollow sterile tray to retain sterile articles therein, with the tray including, a top for access to the articles, a bottom, and at least one side wall connecting the top and the bottom. The shield includes a flexible sheet which covers at least a portion of the tray top and one side wall, and the sheet is sufficiently large to prevent contamination of the tray or articles during grasping of the shield by a user's hands.

3,730,339
COLOR FORMATION INHIBITION FOR STORING ETHYLTHIOETHANOL IN IRON CONTAINING VESSELS
Paul F. Warner, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.
Filed Oct. 8, 1970, Ser. No. 79,326
Int. Cl. B65b *29/00*; **C07c** *149/02*
U.S. Cl. 206—84 **5 Claims**

Amines, e. g., monoethanolamine and diisopropanolamine have been found to stabilize color formation when ethylthioethanol is stored in iron containing vessels such as carbon steel tanks or drums. The action of the inhibitor is specific for the compound ethylthioethanol.

3,730,340
DEVICE FOR TRANSPORTING AND STORING YARN BOBBINS HAVING BOBBIN TUBES
Edeltraud Neubert, nee Preischl, Hauser near 25, 8971 Burgberg/Allgau, Germany
Filed Dec. 10, 1970, Ser. No. 96,703
Int. Cl. B65d *71/00*
U.S. Cl. 206—65 Y **12 Claims**

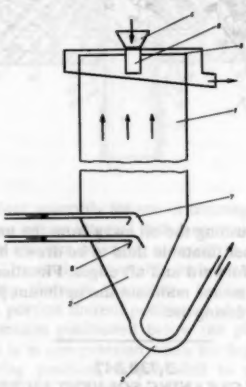


An improvement in a device for transporting and storing yarn bobbin tubes arranged on a substantially horizontal pallet. A number of holding elements are mounted on the pallet which have top and bottom protuberances and depressions for centering and supporting the lower and upper end of the bobbin tubes so that a number of pallets having intermediately mounted yarn bobbin can be stacked one upon the other. Each holding element is composed of two holding element parts made of an injectable or pressable plastic material and arranged one above the pallet and one below the pallet. One holding element part is made of a resilient plastic material and has a substantially cylindrical, radially and resiliently compressible shank provided with an inner lock thereon. The other holding element part has a cylindrical opening thereon to receive the shank, the diameter of the opening is less than the maximum diameter of the shank so that the two holding element parts can be pressed together, the shank having the radial compression factor passing through the opening and snapping into engagement with the other holding element part through the aforesaid inner lock.

3,730,341
FLOTATION OF COARSE PARTICLES

Michel Mames, Ensisheim, and Robert Berthon, Wittelsheim, both of France, assignors to Mines De Potasse D'Alsace, Mulhouse, France

Continuation of Ser. No. 640,670, May 23, 1967, abandoned.
This application Nov. 6, 1970, Ser. No. 87,611
Claims priority, application France, May 24, 1966, 66/62664
Int. Cl. B03d 1/02
U.S. Cl. 209—164 20 Claims



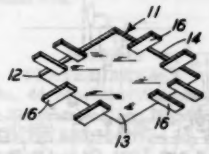
Flotation of coarse particles of ore, particularly sylvinite ore, by passing concentrated conditioned pulp (about 60–70 percent solids) to top of cell just below overflow level, and passing a mixture of air and liquid into bottom of cell to float coarse particles, there being minimal turbulence but sufficient air bubbles for efficient flotation. Suitable apparatus is also provided comprising the flotation of coarse particles, said apparatus comprising a vertical tank, said tank being provided with discharge means, means for the overflow of floated particles suspended in carrier fluid, pulp feeding means at the upper portion of said tank terminating at a level below said means for the overflow, and at the lower portion of said tank means, fixed means for introducing a carrier fluid, and adjacent to said fixed means, fixed dispersing means for the introduction of a supplementary quantity of carrier fluid, said vertical tank further comprising velocity regulating means disposed in said tank for increasing the velocity of said carrier fluid after it is introduced into said tank, and then decreasing the velocity of said carrier fluid prior to reaching said overflow means.

3,730,342
MICROSCOPICALLY INSPECTING AND SORTING ARTICLES

James John Egan, Allentown; Millard Edward Kimmel, Emmaus; Ronald Irwin Strohl, Walnutport, and William Robert Wanesky, Wescoesville, all of Pa., assignors to Western Electric Company, Incorporated, New York, N.Y.

Filed Feb. 24, 1971, Ser. No. 117,929
Int. Cl. B07c 7/00
U.S. Cl. 209—122 14 Claims

Microscopically inspecting and sorting articles such as beam-lead integrated circuits is carried out by positioning an array of articles on a transparent substrate in the field of a dual-objective microscope. The top and bottom sides of the articles are individually inspected with the upper and lower objective lenses of the microscope to determine whether these sides have various defects. A vacuum pickup needle is moved from a cut out portion of a disposal tube to and over each article having a defect to pick it up and hold it. The needle is then withdrawn to move it back into the cut out portion and to move the article into the opening of the tube. The article is then released from the needle and deposited in the opening of the tube; whereupon, a vacuum which has been applied to the tube draws the article into a filter jar. Also, the bottom sides of

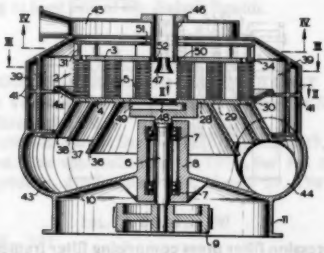


the articles are inspected for the defect of foreign particles and a determination is made as to whether the particles are associated with the articles or the substrate. If associated with the articles, they are deposited in the opening of the tube. Thus, only articles having nondefective sides are left remaining on the substrate.

3,730,343
METHOD AND APPARATUS FOR SEPARATING WATER FROM A MIXTURE OF A GRANULAR MATERIAL AND WATER

Kurt Pause, and Heinrich Buzga, both of Grevenbroich, Germany, assignors to Maschinenfabrik Buckau R. Wolf AG, Munich, Germany

Filed March 2, 1971, Ser. No. 120,174
Claims priority, application Germany, March 4, 1970, P 20 10 128.4
Int. Cl. B01d 33/02
U.S. Cl. 210—68 22 Claims



Water is separated from a mixture of a granular material with water by first separating by a screen all water which is not retained by the granular material, and flows through the screen by the action of gravity. At the same time, the granular material and the retained water is supplied to zigzag-shaped radial channels of a centrifuge where slanted screens separate retained water from the granular material. Water still adhering to the granular material is evaporated by streams of air blowing into the outer end of the zigzag-shaped channels, and into a discharge duct for transporting the granular material to an outlet while evaporating still adhering water.

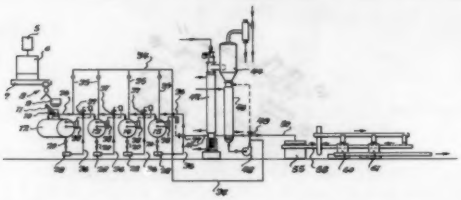
3,730,344
APPARATUS FOR CONTINUOUS RENDERING OF FAT-CONTAINING MATERIALS

Gene C. Mason, Piqua, Ohio, assignor to The French Oil Mill Machinery Company, Piqua, Ohio

Division of Ser. No. 712,265, March 11, 1968, Pat. No. 3,632,615. This application March 27, 1970, Ser. No. 23,196
Int. Cl. B01d 29/00
U.S. Cl. 210—152 4 Claims

This apparatus relates to continuous rendering of fat-containing material by passing the material in succession through

a series of cookers in such a manner that the material can be pumped from one cooker to another by maintaining the material in fluid form and by maintaining the material in the



cooker at a desired level. The cooked material is then passed through other apparatus and finally discharged in the form of liquid fat and solids including crackling cake. This replaces the batch cookers commonly used in rendering plants.

3,730,345

COMPRESSION FILTER PRESS PROVIDED WITH EXPANSIBLE AND CONTRACTIBLE CONNECTING TUBES IN SLURRY PASSAGES

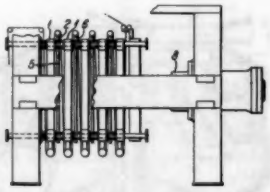
Mikio Suzuki, Handa, Japan, assignor to NGK Insulators Ltd., Nagoya, Japan

Filed April 12, 1971, Ser. No. 133,003

Claims priority, application Japan, Sept. 22, 1970, 45/82522

Int. Cl. B01d *25/12*

U.S. Cl. 210—231 **7 Claims**



A compression filter press comprising filter frames and filter plates alternately arranged in succession around which an endless filter cloth extends and further comprising expansible and contractible connecting tubes in slurry passages. The expansible and contractible tubes connect the slurry passages between adjacent filter frames to provide an absolutely slurry leak-tight construction.

3,730,346

SKIMMING SYSTEM

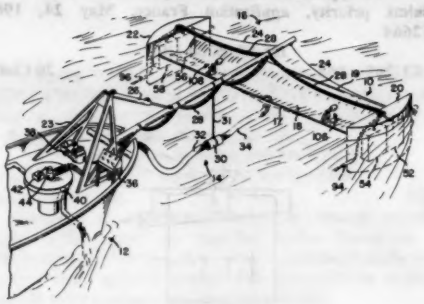
Cecil H. Prewitt, Olympia, Wash., assignor to Cortland Skinner; Cecil K. Glaze and Cecil H. Prewitt, all of Olympia, Wash.

Filed March 1, 1971, Ser. No. 122,600

Int. Cl. E02b *15/04*

U.S. Cl. 210—242 **7 Claims**

A system for skimming floating fluids, such as oil and small pumpable debris, from the surface of a body of water includes an elongated sink-like or trough-like skimming unit adapted to be propelled through the water, with means for drawing fluid from the unit and conducting it to a separator for separating the floatable matter from the water. The elongated skimming unit extends laterally of the path along which the unit is propelled through the water and adjustable floatation means are included for controlling the vertical and angular position of the unit in the water. The skimming unit has forward and aft edges lying in the same horizontal plane and maintained at substantially the same height in the water to prevent creation



of a bow wave pushing the oil away from the unit and to permit the oil or other floatable fluid to be drawn into the trough across both the forward and aft edges. Flotation and propulsion adjustment means maintain the optimum position of the unit in the water during use.

3,730,347

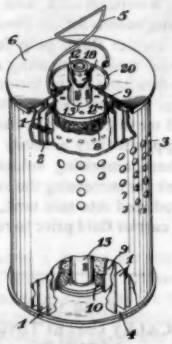
DRY CLEANING SOLVENT FILTER

John J. Giampalmi, Jr., Midland, and William G. Oldford, Lexington, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Nov. 22, 1971, Ser. No. 200,844

Int. Cl. B01d *27/02, 27/04*

U.S. Cl. 210—266 **4 Claims**

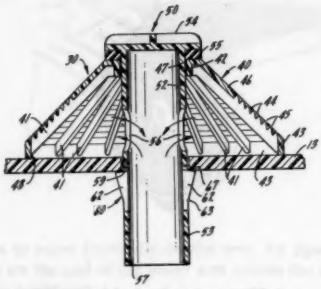


An improved dry cleaning solvent filter cartridge comprising for the greater part conventional filter cartridge configuration and construction, i.e., an outer tubular element of accordion plaited filter paper and an inner tubular bed of activated charcoal all enclosed in a perforated outer cylindrical metal shell with a perforated concentric center tube serving as the filtered solvent outlet, contains a perforated unidirectional lockable annular metal retainer on the top of the charcoal bed and a cooperating locking section in either or both tubular walls of the charcoal bed, said retainer locking in place when pressed down on the bed by engagement between one or both of its inner and outer peripheral edges and inward projections on the corresponding wall or walls holding the charcoal bed.

3,730,348
FILTER SCREEN

Frank G. Weis, Kansas City, Mo., and Marvin E. Wood, Lenexa, Kans., assignors to Ecodyne Corporation, Chicago, Ill.

Filed April 19, 1971, Ser. No. 135,263
Int. Cl. B01d 29/08
U.S. Cl. 210—274 6 Claims

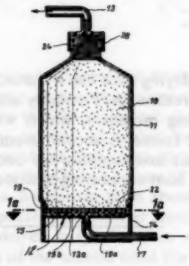


A filter strainer assembly for use in filtering apparatus having retaining lug means integral with a central portion thereof for holding the strainer assembly securely to a filter bed supporting plate. The strainer assembly includes a vertical center section, passing through the plate, having a passageway through a side portion thereof positioned above the plate and retaining lug means positioned below the plate. A resilient washer, which is in compression when the lug means is in its strainer securing position, is provided to compensate for material elongation. A passageway in the central section below the plate is formed by the lug means to permit gas accumulated under the plate to pass through the strainer.

3,730,349
ION EXCHANGE FILTER PARTICULARLY A MINIATURE FILTER

Willy Herrmann, Strombergstrasse 21, Ludwigsburg, Germany

Filed April 8, 1971, Ser. No. 132,275
Claims priority, application Germany, April 29, 1970, P 20 20 929.4; Aug. 14, 1970, G 70 30 537.2
Int. Cl. B01d 27/02
U.S. Cl. 210—281 9 Claims

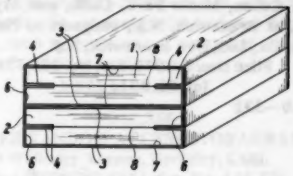


The filter includes a container filled with ion exchange material and has an upper opening, with the liquid to be treated flowing longitudinally upwardly through the container from a bottom inlet. The container has a bottom wall and sidewalls extending upwardly from the bottom wall and with upper ends converging inwardly to the upper opening. At least one plate, having lateral dimensions substantially equal to the inner lateral dimensions of the container adjacent the bottom wall, is positioned on the bottom wall and has openings for the passage of liquid to be treated. The plate is formed of material which is sufficiently flexible to provide for the plate to be inserted through the upper opening into the container. In one embodiment of the invention, a single flexible plate has elevations on its surface toward the bottom wall, spacing the plate from the bottom wall. In another embodiment of the invention, a second plate of sponge-like material is positioned on top of the first plate. In a third embodiment of the invention, only a plate of sponge-like material is used and the inner surface of the bottom wall is formed with a series of concentric discontinuous annular ribs.

3,730,350
PLATE DIALYZER

Josef Hoeltzenbein, 44 Muenster/Westphalia, Germany, assignor to Baxter Laboratories, Inc., Morton Grove, Ill.

Continuation of Ser. No. 880,324, Nov. 26, 1969, abandoned. This application July 12, 1971, Ser. No. 161,818
Claims priority, application Germany, July 26, 1969, P 19 38 008.6; Dec. 7, 1968, 6,810,380; Dec. 27, 1968, 6,813,222; Jan. 27, 1969, 6,902,959
Int. Cl. B01d 31/00
U.S. Cl. 210—321 18 Claims

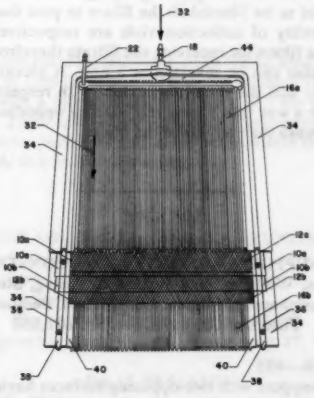


A plate dialyzer is provided with plates and membranes located therebetween. The membranes extend along the front sides of the plates and are bent around the ends of the plates. The ends of the membranes are tightly clamped between two adjacent plates. The plates have channels used for supplying or removing at least one of the dialysis liquids.

3,730,351
DISPOSABLE BLOOD DIALYSER UNIT

Mario Nino Veronesi, Mirahdola, Italy, assignor to Steriliplast S.p.A., Mirandola, Italy

Continuation-in-part of Ser. No. 20,305, March 17, 1970, abandoned. This application July 1, 1971, Ser. No. 158,730
Claims priority, application Italy, March 27, 1969, 31044 A/69
Int. Cl. B02d 31/00
U.S. Cl. 210—321 1 Claim



The invention concerns an improved dialyser unit of flat rectangular construction, comprising a flat membrane en-

velope provided with a blood inlet at one end and a blood outlet at the other end, membrane support material covering the two outer surfaces of the membrane envelope and being made up of an inner series of coplanar parallel strands against the outer surfaces of the membrane envelope and an outer series of coplanar parallel strands crossing the inner series of the side outwardly of the membrane envelope, spacer elements arranged across the free outer series of coplanar parallel strands of the membrane support material, and a housing having a dialysate inlet and outlet, defining a dialysate flow passage with the spacer elements and outer surfaces of the membrane envelope, the inner series of coplanar parallel strands of the membrane support material against the one outer surface of the membrane envelope being arranged at an angle relative to the inner series of coplanar parallel strands against the other outer surface of the membrane envelope.

3,730,352

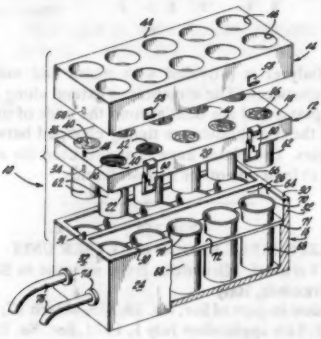
FILTRATION APPARATUS

Stanley N. Cohen, Menlo Park, Calif., and Myron Tannenbaum, East Brunswick, N.J., assignors to New Brunswick Scientific Co., Inc., New Brunswick, N.J.

Filed Dec. 6, 1971, Ser. No. 205,776

Int. Cl. B01d *29/04*

U.S. Cl. 210—332 **9 Claims**



A filtration apparatus for simultaneously performing a plurality of filtering operations. A plurality of filters are respectively situated beneath a plurality of reservoir cavities for supplying liquid to be filtered to the filters to pass therethrough, and a plurality of collection vials are respectively situated beneath the filters for receiving the filtrate therefrom. The entire apparatus can be inverted as a unit. A plurality of seals respectively seal the reservoir cavities with respect to the filters in such a way that during the washing operations washing liquid can wash the margins of the filters.

3,730,353

FILTER SUPPORT AND FILTER UNIT CONSTRUCTION

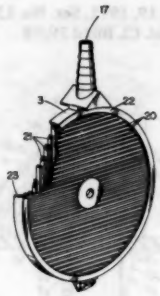
Ben Trasen, Wellesley, and Donald B. Rising, Stow, both of Mass., assignors to Millipore Corporation, Bedford, Mass.

Filed Dec. 28, 1970, Ser. No. 101,850

Int. Cl. B01d *35/02*

U.S. Cl. 210—455 **3 Claims**

A filter support with two opposing surfaces having perforations in the central portion and a flat surface surrounding the central portion. The perforations permit passage of fluid between the support surfaces. An inlet and outlet means are attached to the peripheral surface of the holder and the outlet is in fluid communication with the perforations in both support surfaces. A filter unit is formed by sealing a cover and a filter membrane to each flat surface.



3,730,354

FOLDING BOOT-DRYING RACK

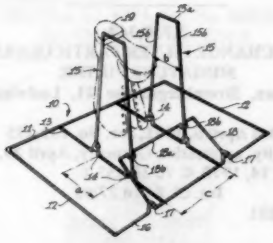
Benjamin Bronstein, McLure, British Columbia, Canada

Filed Nov. 5, 1971, Ser. No. 196,055

Claims priority, application Canada, May 17, 1971, 113,164

Int. Cl. A47f *7/08*

U.S. Cl. 211—38 **3 Claims**



A folding boot-drying rack has a frame, open to permit the passage of air therethrough. Pivotably attached to the frame are boot supporting members, which when not in use are folded against the frame. A second member is pivotably attached to the frame and supports the boot supporting members in an upright, boot-supporting position.

3,730,355

UNITARY HANGER FOR DISPLAYING ARTICLES

Burton G. Feldman, 175 E. Delaware St., Apt. 6403, Chicago, Ill.

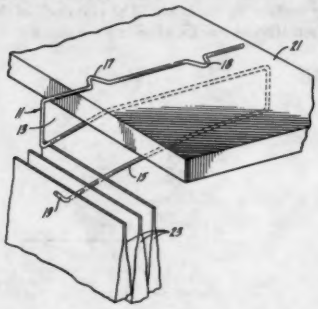
Filed June 9, 1971, Ser. No. 151,429

Int. Cl. A47f *5/01*, *1/00*, *7/00*

U.S. Cl. 211—59 **1 Claim**

A unitary hanger for retaining articles to be displayed comprising a generally S-shaped, resilient rod having an upper jaw and a lower arm. The upper jaw generates a closing pressure for grasping a shelf or other support beam. The upper jaw also has stabilizing tabs for engaging the support beam and holding

the hanger stationary. The lower arm deflects downward under the weight of the articles disposed on the arm causing



the articles to move forwardly on the arm. An upwardly extending tip on the end of the lower arm retains the articles in place on the lower arm.

3,730,356

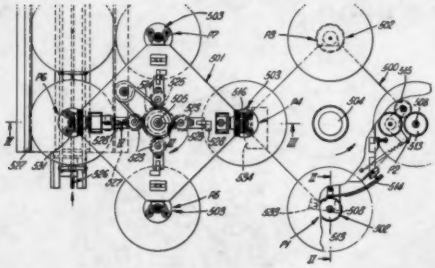
ARTICLE PRESENTING APPARATUS

Walter Howard Bossons, c/o Thrissell Works, Eaton Road, Bristol; David George Parker, 21, Westhall Road, Warlingham, and George Davey Burcher, c/o Molins Limited, Haw Lane, High Wycombe, all of England

Filed May 5, 1971, Ser. No. 140,508

Int. Cl. B65g *29/00*

U.S. Cl. 214—1 BC **11 Claims**



Records are presented to inspection devices by feeding each record in turn to one of four members which supports the record from below so that its upper surface may be inspected, the members being carried on a first head intermittently rotatable in 90° steps. After three such steps from the feeding position the record is transferred to one of four further members which supports the record from above so that its lower surface may be inspected, the further members being carried on a second head driven in synchronism with the first head. After two 90° steps of the second head the record is released from the further member.

3,730,357

AUTOMATIC STACKING APPARATUS

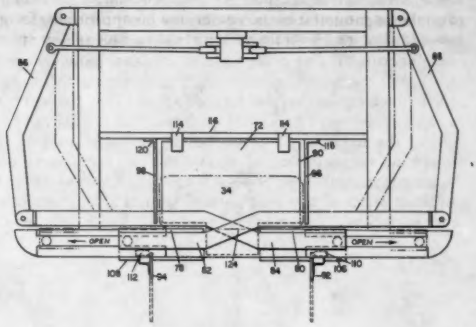
Thomas Beaty, Jr., 20180 Whipple Drive, NOrthville, Mich., and Asib S. Samander, 25802 Jeanette, Roseville, Mich.

Continuation-in-part of Ser. No. 101,529, Dec. 28, 1970. This application May 12, 1971, Ser. No. 142,545

Int. Cl. B65g *57/06*

U.S. Cl. 214—6 DK **8 Claims**

A method and apparatus for automatically loading items onto a pallet. The loading means has a pocket to contain the items to maintain their consistent positioning, and guides to accurately deposit the items on the pallet. The loading means may move laterally, transversely, vertically and rotatably



enabling a variety of loading configurations. The entire operation may be hydraulic, or pneumatic, and may be controlled by a program, such as by the use of a program tape, or cards, or by a conventional relay control panel.

3,730,358

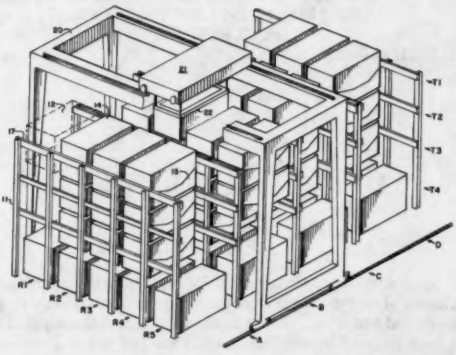
CONTAINER RANDOM ACCESS STORAGE SYSTEM

Sukeo Oji, 709 Wellesley Avenue, Berkeley, Calif.

Filed March 19, 1971, Ser. No. 126,228

Int. Cl. B65g *1/06*

U.S. Cl. 214—16.4 A **2 Claims**



A three-dimensional multi-tier, open frame, structure defining spaces or cells for receiving modular shipping containers is arranged with a movable cradle in each cell for holding the container. Each cradle can be moved horizontally one cell width so that a particular container stored within the structure is accessible to a crane from above.

3,730,359

FREIGHT AIRCRAFT LOADING AND UNLOADING PLANT

Leif Andersson, Gothenburg, Sweden, assignor to Siccor Ltd., Zug, Switzerland

Filed May 20, 1971, Ser. No. 145,339

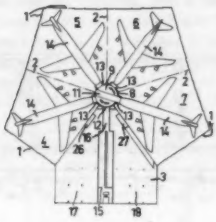
Claims priority, application Germany, May 27, 1970, P 20 26 974.3

Int. Cl. B65g *67/00*

U.S. Cl. 214—38 D **16 Claims**

A freight aircraft loading and unloading plant has a pentagonal ground contour confining four spaces for the aircrafts

and one space for a freight transport system. The ground contour of the individual spaces has been generated by dividing the regular pentagon into five similar sections by partition lines running from the middle of each side of the pentagon towards the center thereof. A cargo distributor including a turntable is mounted in the center and comprises also freight transfer stations. Aircraft are received in four of the spaces



standing on a middle line therein with their noses towards the center and each in position for one of the freight transfer stations. The fifth section includes a transport arrangement for the cargo which passes on conveyor means to the transfer stations and is distributed therefrom to the correct aircraft by the turntable as the aircraft is loaded. Unloading takes place in the opposite direction. The plant is adapted to serve aircraft built for nose loading as well as for loading through the side of the hull.

3,730,360

UNIT TRAIN AUTOMATIC UNLOADING SYSTEM

Herman A. Aquino, Hobart, Ind., and Willis H. Knippel, Palos Park, Ill., assignors to Pullman Incorporated, Chicago, Ill.

Filed May 21, 1971, Ser. No. 145,676

Int. Cl. B65g *67/24*

U.S. Cl. 214—63 **23 Claims**

An automatic control system for regulating the opening and closing of railway hopper car discharge doors and including an electrical and a hydraulic system which senses the approach of a unit train to actuate trackside cam and sensing means to discharge the load, such as, coal into below track pits. Pit sensors sense the height of the coal in each successive pit and signal the electrical and hydraulic control system to prevent discharge of coal into a full pit. Safety control means are included in the system to prevent the door opening cam track means from being raised under the locomotive and from being raised under the caboose. The speed sensor in the control circuit will determine if the train is approaching at too high velocity, and will lower the cam devices and the sensing devices away from trackside so as not to be damaged by the approaching overspeed train.

3,730,361

VEHICLE RAMP

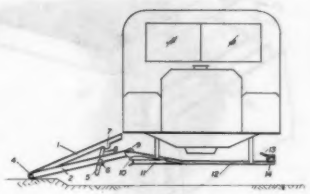
Orren E. Haynes, Forest Park, Ga., assignor to Robert L. Zink, Norwalk, Conn.

Filed July 28, 1971, Ser. No. 176,355

Int. Cl. B65g *67/02*

U.S. Cl. 214—85 **2 Claims**

A ramp normally stored on a carrier beneath a surface, the ramp and carrier being brought out along a track fixed beneath the surface into an extended position, the ramp end being then raised to the level of the surface by a strut attached to the carrier creating a triangular truss supported at one end by the track and at the other end by the level being connected with the surface by the ramp. The two ends of the carrier may travel on different tracks, allowing the ramp and carrier, when



collapsed together, to follow the configuration of the underside of the surface while returning to the storage position.

By way of an example, a gangway beneath a vehicle which is extended into place, the gangway floor then being raised to the level of the floor of the vehicle while being supported by the framework structure beneath the floor.

3,730,362

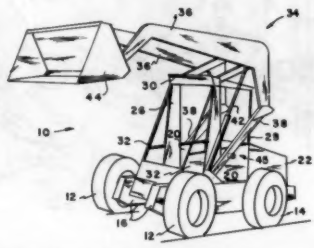
ANTI-LOWERING DEVICE FOR A LOADER BOOM

Joseph C. Hurlburt, Leola, and John L. Stohler, Ephrata, both of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

Filed Sept. 9, 1971, Ser. No. 178,972

Int. Cl. E02f *3/00*

U.S. Cl. 214—140 **1 Claim**



A pair of locking pins each disposed at a predetermined height adjacent a respective side wall of a loader and operative to be selectively moved outwardly therefrom such that the outer portions thereof project through the vertical planes of a pair of boom arms, thereby prohibiting the boom arms from lowering beyond the predetermined height.

3,730,363

CUTTING HEAD FOR COMMINUTING MACHINES

Josef Karpf, Socking-Jungholz, Germany, assignor to G. W. Steffens, Remscheid, Germany

Filed June 2, 1971, Ser. No. 149,254

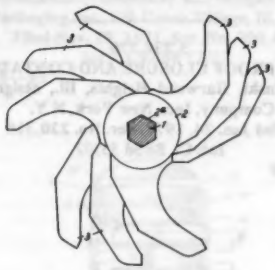
Claims priority, application Germany, June 4, 1970, P 20 27 429.7

Int. Cl. B02c *18/00*

U.S. Cl. 241—282.1 **12 Claims**

A cutting head for comminuting machines, particularly meat cutting machines, includes rotatable angularly displaced

knives which are secured to a knife support or driving disk by means of cooperating, or engaging, sets of teeth precluding



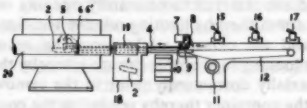
displacement of the knife in a direction longitudinally thereof relative to their support.

3,730,364

APPARATUS FO.. CHARGING SAMPLES TO ANALYZING APPARATUS

Toshimi Nakamura, and Hiroyuki Koide, both of Kitakyushu, Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Filed May 5, 1971, Ser. No. 140,347
Int. Cl. G01n *31/08*
U.S. Cl. 214—302 13 Claims



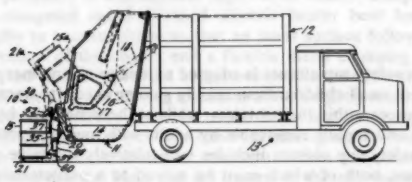
An apparatus for charging samples to an analyzing apparatus in a prescribed time sequence having a conveyor for sequentially moving a series of tray receivers into a charging position relative to the analyzing apparatus, a reciprocable charging rod for moving a tray containing a sample from its respective tray receiver on the conveyor into the analyzing apparatus and having a hook thereon for removing the tray from the analyzing apparatus following analysis, and a device for unloading the residue of the analysis from the tray into a collecting box.

3,730,365

APPARATUS FOR DUMPING HEAVY CONTAINERS

William A. Herpich, Galion, Ohio; George W. Palmer, and Ray E. Bartholomew, both of Durant, Okla., assignors to Peabody Galion Corporation, Galion, Ohio

Filed May 5, 1971, Ser. No. 140,496
Int. Cl. B65f *3/02*
U.S. Cl. 214—302 11 Claims



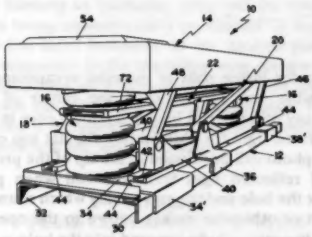
An apparatus for dumping containers of various types such as barrels, open top carts, rectangular boxes, and the like into a walled receiver. The apparatus is mountable on fixed supports or on a vehicle such as a conventional rear loading refuse truck. The apparatus has an "L" shaped container carrier. A quadrant is pivotally mounted on the fixed support or truck body at approximately the level of the top of the receiver wall. The container carrier is pivotally mounted at its upper end on the same axis as but separate from the quadrant. A first extensible cylinder means is connected between the quadrant and a lower portion of the vertical arm of the container carrier. A second cylinder means is connected between a lower part of the receiver and the quadrant. The pivotal connections of the cylinders to the quadrant are spaced radially from the quadrant pivot and circumferentially from each other. The vertical arm of the container carrier telescopes to accept containers of different heights and the container carrier has container latching means.

3,730,366

CONTAINER LIFT

Howard P. Berends, Fruitport, Mich., assignor to Holland Hitch Company, Holland, Mich.

Filed Jan. 4, 1971, Ser. No. 103,576
Int. Cl. B60p *1/02*
U.S. Cl. 214—512 6 Claims



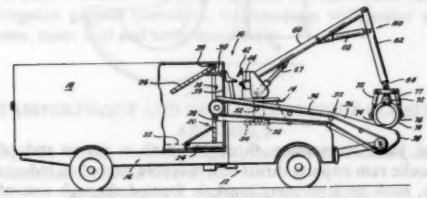
A vehicular haulage apparatus having an elevator load platform vertically shiftable on a wheeled support frame by a plurality of fore to aft spaced inflatable, deflatable bellows units, the bellows units being joined at the vertically intermediate portions thereof by distortion preventing tie means. A parallelogram linkage as well as stabilizer and position controlling linkage, joins the load platform with the underlying frame. The tie means is interrelated with the stabilizer linkage.

3,730,367

MOBILE REFUSE RETRIEVER

Thomas E. Heffington, 4605 Valerie, Bellaire, Tex.

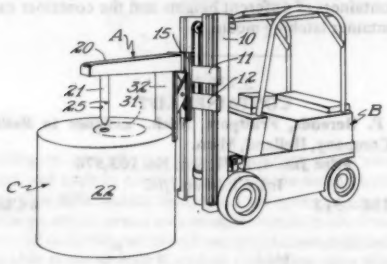
Continuation of Ser. No. 828,832, May 29, 1969, abandoned.
This application Sept. 21, 1970, Ser. No. 74,189
Int. Cl. B60p *1/50*
U.S. Cl. 214—518 12 Claims



The present invention is directed to a mobile refuse retriever which is to be used to pick up and carry away objects such as bar garbage bags, bundles of trash, limbs, rubbish, and the like. The present invention utilizes on a motorized vehicle a hydraulic crane having a cage on its free end to grasp or scoop the refuse. The crane then deposits the refuse on the receiving end of a conveyor carried by the vehicle. Also car-

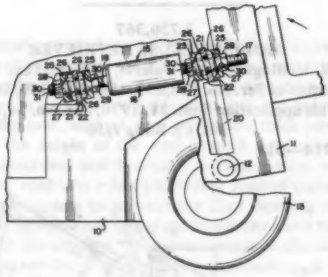
ried by the vehicle is a packer body having a packer plate with a normally closed door therein. The discharge end of the conveyor deposits the refuse through this door and onto the operative side of the packer plate.

3,730,368
LIGHT GUIDED CENTER LIFT
Herbert Francis Dalglish, 284 Cherokee Avenue, St. Paul, Minn.
Filed Jan. 6, 1972, Ser. No. 215,754
Int. Cl. B66c 1/54
U.S. Cl. 214—653 **10 Claims**



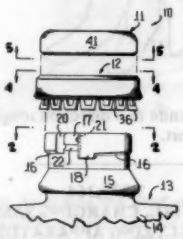
Apparatus for lifting rolls of material comprising a probe with expansible jaws for engaging the center of a roll of material or any other object having a hollow core in combination with a flood light for illuminating the flat top of a roll of material. A photo cell positioned in the tip of the probe senses the lack of reflected light from the roll when positioned directly over the hole and triggers a relay which sounds a horn, lights a light or otherwise makes known to the operator that the probe is in position to be lowered into the hole.

3,730,369
THRUST IMPARTING JOINT CONNECTION
Derek K. Keene, and Edward W. Miller, both of Philadelphia, Pa., assignors to Eaton Corporation, Cleveland, Ohio
Filed May 7, 1971, Ser. No. 141,321
Int. Cl. B66f 9/08
U.S. Cl. 214—674 **4 Claims**



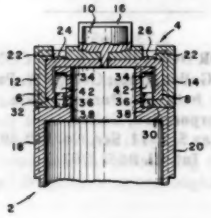
The joint connection through which a piston rod of a hydraulic ram imparts thrust to a movable part of an industrial truck, such as a pivoting mast, is formed through assembly about the thrust end of the piston rod, of a plate welded or otherwise fixed to the mast, and traversed by the piston rod, a pair of washers having each a flat surface whereby to slide on the plate, and an opposed spherical surface, together with a pair of cones having tapered surfaces applied to the said spherical surfaces. These cones are also mounted on the piston rod, and means are provided for holding the cones and washers assembled relatively to the rod and the plate in an adjusted position on the length of the rod. The washers slide relatively to the plate and pivot relatively to the cones for contributing universal movement between the piston of the cylinder and the plate fixed to the mast.

3,730,370
CHILDPROOF CLOSURE AND CONTAINER
Frank H. Lecinski, Harwood Heights, Ill., assignor to Continental Can Company, Inc., New York, N.Y.
Filed Jan. 24, 1972, Ser. No. 220,310
Int. Cl. B65d 55/02
U.S. Cl. 215—9 **20 Claims**



This disclosure relates to a childproof closure and container which includes three components, namely, a container, a closure and a novel fitment including an annular wall adapted to exteriorly telescopically embrace a peripheral skirt of the closure when the same is seated upon the container finish, means in the form of projecting fingers are formed inboard of the annular wall and are received in outwardly opening recesses of the container finish thereby limiting relative rotation between the fitment and the closure while providing recesses into which project locking lugs of the closure whereby the fitment must be slid axially downwardly prior to the removal of the closure from the container thereby rendering the combination childproof.

3,730,371
SAFETY CLOSURE
Edward J. Corcoran, P.O. Box 3395, Lantana, Fla.
Filed Feb. 22, 1972, Ser. No. 227,903
Int. Cl. B65d 55/02
U.S. Cl. 215—9 **14 Claims**

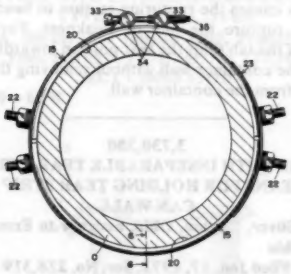


The safety cap closure is adapted to lock to a container and prevent small children from readily gaining access to harmful substances within the container, while at the same time, being easily and rapidly removable by adults with impaired vision. The safety cap closure includes two relatively rotatable cap sections, both of which must be moved to a predetermined position to unlock the cap closure. Surface discontinuities located on the cap sections and the container are alignable by means of the tactual sense to enable rapid release of the safety cap closure without the use of the visual senses.

3,730,372
PLASTIC CONTAINER
Henry Komendowski, Evanston, Ill., assignor to Automatic Liquid Packaging Inc., Elk Grove Village, Ill.
Filed Nov. 19, 1971, Ser. No. 200,489
Int. Cl. B65d *17/02*
U.S. Cl. 215—32 19 Claims

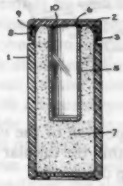
A plastic container with an integral cover has a cap screw threaded to the cover. Manipulation of the cap causes the cover to be severed from the container body. The cap has an attached implement, such as a spoon, fork or knife for removing a product from the container.

3,730,373
BAND-TYPE ELECTRIC HEATERS
Lloyd S. Kozbelt, Pittsburgh, Pa., assignor to Emerson Electric Co., St. Louis, Mo.
Filed March 30, 1972, Ser. No. 239,593
Int. Cl. H05b *3/58*
U.S. Cl. 219—535 3 Claims



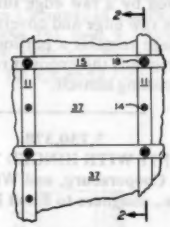
A band-type electric heater adapted to be secured around the periphery of a cylindrical object to be heated, comprising an elongated metal-sheathed electric heater bent longitudinally to arcuate shape so that an inner surface follows the curvature of the object, and a flexible metal clamping band adapted to encompass the object and overlie the outer surface of the heater, and having means to draw it tightly around the object and thereby press the heater inner surface against the periphery of the object. The band has embossments which engage the heater outer surface and limit surface-to-surface contact between the band and the heater, to thereby reduce the amount of heat conducted to the band, and to also reduce frictional contact between the band and the heater to permit the two to move relatively and adjust to conform to good heating relationship with the object at the time the band is drawn tightly around the object.

3,730,374
INSULATED CONTAINER
Eugene A. Picciano, West Caldwell; Francis C. Clark, Madison, and Frank J. Neggers, Hopatcong, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.
Filed June 1, 1971, Ser. No. 148,553
Int. Cl. B65d *25/18*
U.S. Cl. 220—9 F 4 Claims



A dual container suitable for protecting the contents from changes in environmental conditions comprises the combination of an outer container having a screw thread neck, with a smaller inner container, the area between the inner and outer container forming an insulating zone and the inner and outer containers being concentrically positioned. A support means maintains the inner container in the desired position within the outer container. In the insulating zone air may provide the required insulation or it may be filled with an insulating substance which can also act as the support means. The screw on cap provided is designed to form a moisture impermeable seal over the mouth of the inner container.

3,730,375
FLUID CONTAINMENT SYSTEM
Edwin E. Reed, and E. Kleinmann, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.
Filed Dec. 27, 1971, Ser. No. 212,119
Int. Cl. B65d *25/18*, *7/22*, *25/00*
U.S. Cl. 220—9 LG 8 Claims



A fluid container comprises spaced horizontal and vertical elongated support members, intermediate wall, outer membrane, inner wall and inner membrane.

3,730,376
TAMPERPROOF AND REUSABLE STERILE CLOSURE ASSEMBLY
Joseph T. Wood, Northbrook, Ill., assignor to Baxter Laboratories, Inc., Morton Grove, Ill.
Filed March 3, 1971, Ser. No. 120,439
Int. Cl. B65d *17/06*
U.S. Cl. 220—27 8 Claims

A tamperproof and reusable sterile closure assembly for a container is provided including a tubular neck element which is attached to the container and a closure device having overcap and stopper portions which are adapted to be telescopically associated relative to the tubular neck element. The overcap portion of the closure device is initially frangibly connected to the tubular neck element in surrounding relation-

ship to the stopper portion of the closure device. When the closure device is frangibly disconnected from the tubular neck

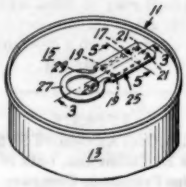
element, the stopper portion of the closure device is capable of being positioned within the tubular neck element in slidable and sealed relationship therewith.

3,730,377

PULL TAB END FOR CAN

Richard Joseph Brincks, Wheeling, Ill., assignor to American Can Company, Greenwich, Conn.

Filed March 13, 1972, Ser. No. 234,065
Int. Cl. B65d *17/24*
U.S. Cl. 220—27 **10 Claims**



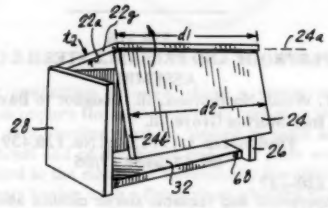
A pull tab can end which exposes substantially no raw edge to create a hazard to the user. The end has an orifice whose periphery is defined by a raw edge turned upward. A membrane lies over the raw edge and covers the orifice. When the end is opened, there remains a portion of the membrane on the end which surrounds the exposed raw edge, thus preventing the user from cutting himself.

3,730,378

STORAGE UNIT WITH HINGED TOP AND FRONT

Don C. Albinson, Coopersburg, and William I. Stephens, Telford, both of Pa., assignors to Knoll International Inc., New York, N.Y.

Filed June 15, 1971, Ser. No. 153,352
Int. Cl. B65d *51/18*
U.S. Cl. 220—29 **13 Claims**



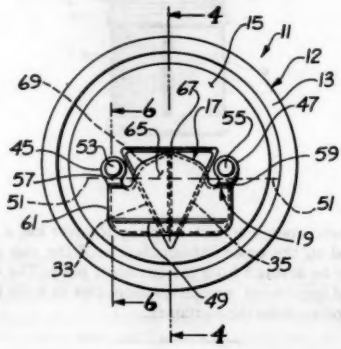
A storage unit formed from a top panel and a front panel. The front panel is pivotally mounted about an axis at the top thereof to the top panel. The top panel includes a space therein to receive the front panel when the latter is pivoted from a normal perpendicular relationship with the top panel about the axis to a parallel relationship with the top panel. The top panel is pivotally attached to a back panel. Stop means are employed to limit the pivotal movement of each panel.

3,730,379

EASY OPENING CAN END WITH NONREMOVABLE TAB

Omar L. Brown, Dayton, Ohio, assignor to Ermal C. Fraze, Dayton, Ohio

Filed May 10, 1971, Ser. No. 141,509
Int. Cl. B65d *17/00*
U.S. Cl. 220—48 **14 Claims**



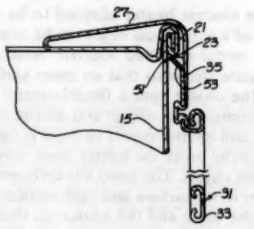
An easy opening container wall comprising a container wall of sheet material, a line of weakness in said container wall at least partially defining a tear portion, a tab having an attachment portion joined to a lever portion for pivotal movement of the lever portion relative to the attachment portion. The lever portion has a rupturing section and the attachment portion is attached to the container wall outside of the tear portion on opposite sides thereof with the rupturing section overlying a region of the tear portion. Pivotal movement of the lever portion causes the rupturing section to bear on the tear portion and rupture the line of weakness. Further pivotal movement of the tab folds the tear portion inwardly to form an opening in the container wall without removing the tab or the tear portion from the container wall.

3,730,380

CAN END WITH INSEPARABLE TEAR STRIP AND LATCH MEANS FOR HOLDING TEAR STRIP AGAINST CAN WALL

Francis M. Silver, Dayton, Ohio, assignor to Ermal C. Fraze, Dayton, Ohio

Filed Jan. 17, 1972, Ser. No. 218,319
Int. Cl. B65d *17/24*
U.S. Cl. 220—54 **9 Claims**



A container comprising a container body and a can end of sheet material attached to the container body. The can end

has a line of weakness therein defining a tear portion partially removable from the can end to form an opening in the can end. A tab is attached to the tear portion to partially remove the tear portion from the can end and for peeling the tear portion back away from the opening. Cooperating members are provided on the tab and the container for retaining the tab and tear strip in the peeled back condition.

3,730,381

CAN END OPENING MEANS

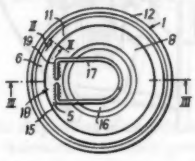
Jozef Tadeusz Franek, Chorley Wood, and Peter Rhodes, Watford, both of England, assignors to The Metal Box Company Limited, London, England

Filed Feb. 28, 1972, Ser. No. 229,849

Claims priority, application Great Britain, March 2, 1971, 5,773/71

Int. Cl. B65d 17/24

U.S. Cl. 220—54 **8 Claims**



In a can end comprising an end closure member having a line of weakening which defines a removable panel and which carries a pull tab for removal of the panel, the pull tab is a rigid member attached rigidly to the removable panel. The can is opened by rocking the pull tab back and forth so as to deform the material of the panel adjacent to the pull tab and partly bonded by a portion of the line of weakening. This causes strain reversal and consequent fatigue failure in the said portion of the line of weakening.

3,730,382

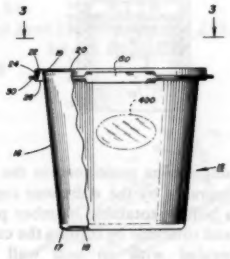
PLASTIC PAIL WITH INTEGRAL HANDLE AND PLUG-TYPE PLASTIC COVER

Raymond A. Heisler, 657 Dakota Trail, Franklin Lakes, N.J.

Filed March 9, 1971, Ser. No. 122,303

Int. Cl. B65d 43/10

U.S. Cl. 220—60 R **12 Claims**



A molded one-piece plastic pail of tapered configuration has a handle molded integrally with a top outwardly extending rim. This handle, as molded, lies in a plane normal to the axis of the container and at a determined distance down from the top of the outer rim. A plurality of intermediate gate portions is provided between the handle and the rim during molding and is left connected to the handle and rim so as to maintain the handle in a determined spaced condition and position during the time the container is being shipped, filled and stored. The cover is formed to provide a plug fit with the open end of the container. The inner upper edge of the container's open end has a retaining ledge formed so as to engage a molded notch formed at the upper end of the plug seal portion of the cover. This provides an upper seal of the plug seal of the cover. At the lower end of the plug seal portion the cover has an interference fit with a tapered portion of the container to form a lower fluid tight seal. From the plug seal the cover is formed with an outwardly extending portion that terminates at a downturned annular flange which is sized so as to snugly engage an outer annular flanged edge provided by the container rim. In its mounted condition the downturned annular flange portion of the cover is slid over the outer edge of the container to provide a tension member by which the retaining ledge of the container is maintained in engagement with the notch in the cover. This sealing condition is maintained until the annular flange of the cover is displaced from the container rim and then from the plug seal of the container. The container sidewalls are formed with a taper disposed to slide one within the other and to provide a determined clearance in a non-locking condition as the outer rim of one container is caused to rest upon the outer rim of a succeeding lower container. In a stacked and stored condition the sidewalls of the container are disposed in a determined spaced relationship permitting ready separation or unstacking of the containers. A pry slot is provided between cover and outer rim of the container. A self-sealing plug is provided in those covers for containers which are to have tinting colors added at the point of sale. In an alternate embodiment the upper rim of the container is provided with an outwardly extending upper bead. The cover is complementarily formed to provide a mating receiving groove to engage and retain this bead in its outer, downwardly turned flange portion. The upper outwardly extending ring portion of the cover in its mounted condition is stretched outwardly to bring the mating receiving groove of the cover over and onto the outer bead of the container rim.

3,730,383

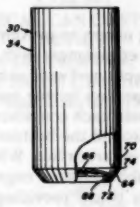
CONTAINER BODY AND A METHOD OF FORMING THE SAME

Lloyd G. Dunn, Lower Burrell; James R. Morran, New Kinsington, and Donald L. Peters, Delmont, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Division of Ser. No. 856,331, Sept. 9, 1969. This application July 29, 1971, Ser. No. 167,204

Int. Cl. B65d 7/42

U.S. Cl. 220—66 **3 Claims**



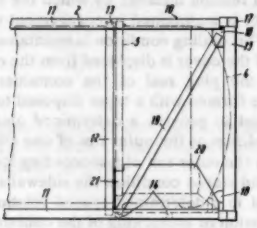
An aluminum container body and a method of forming the same by ironing the side wall of a drawn cup to thin and lengthen it, and reforming the bottom end wall of the ironed cup to form therein an upwardly domed central portion connected through a substantially vertical wall section and an outwardly and upwardly tapered shoulder into the side wall of the can body. The ironed can body may have a protective coating applied to its inner surfaces and cured thereon prior to reforming the end wall.

3,730,384

TANK CONTAINERS

Hans Joachim Ramme, Gebr. Grimm Str. 5, Flechtdorf, Germany

Filed July 20, 1970, Ser. No. 56,387
Claims priority, application Germany, July 22, 1969, P 19 37 192.7
Int. Cl. B65d 7/14, 7/44
U.S. Cl. 220—71 12 Claims



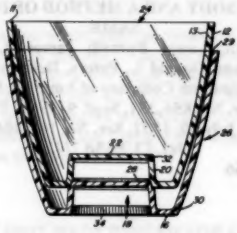
This invention relates to a tank container comprising a receptacle with a cylindrical middle portion provided with domed covers and run-off fittings, and a frame or cradle the corners of which are provided with purpose-made container corner fittings.

3,730,385

NESTABLE CONTAINER

Karl H. Rost, Siegburg, Germany, assignor to Roslin Corp., Palm Beach, Fla.

Filed Feb. 16, 1971, Ser. No. 115,440
Int. Cl. B65d 21/02
U.S. Cl. 220—97 C 2 Claims



A container having means to prevent binding and rotation and provide positive engagement with adjacent nested containers. The bottom section of each container includes an upwardly offset center portion having teeth spaced around the top circumference inside each container. A corresponding set of teeth is provided around the bottom circumference of the center portion on the outer surface. When stacked, or nested, the bottom teeth of each container engage the top teeth of the container immediately below providing positive engagement without binding or rotation.

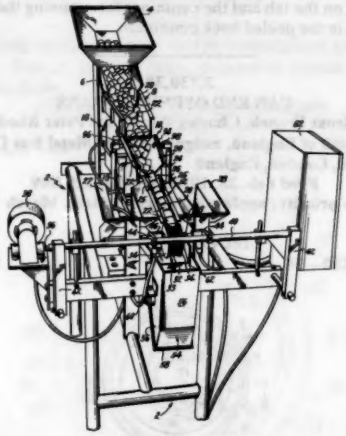
3,730,386

ARTICLE ARRANGING AND COUNTING MACHINE

Claude E. Monsees, Durham, N.C., assignor to Wright Machinery Company, Inc., Durham, N.C.

Filed May 10, 1971, Ser. No. 141,690
Int. Cl. B65g 23/74
U.S. Cl. 221—7 8 Claims

A cascade of vibratory conveyors receive discrete fragile articles in bulk and by operating successive conveyors at higher rates the articles are delivered in a single row to a rotary brush which accelerates successive articles to provide spaces between them. The spaced articles are photoelectrically counted and dropped onto a bottom closure in a receiver. After a predetermined count a partition is interposed in the



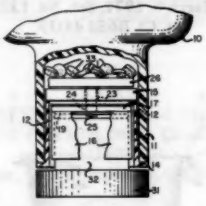
receiver to temporarily intercept and hold further articles, while feeding and counting continues, until the articles on the closure have been discharged and the closure returned to closed position. A portion of one of the conveyors is so narrow it can hold only a single row of articles.

3,730,387

PILL DISPENSING DEVICE HAVING PLURAL CUT-OFF TRAP CHAMBER

John A. McConnell, 5680 Robertson Avenue, and Everett W. Williamson, 36338 Concord Place, both of Newark, Calif.

Filed July 12, 1971, Ser. No. 161,742
Int. Cl. B65d 83/04
U.S. Cl. 221—265 4 Claims



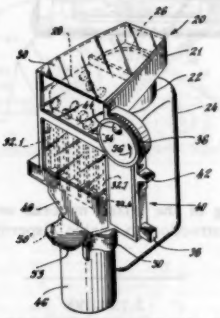
A pill dispensing device positioned in the neck of the pill container and operable by the container cap. The device is provided with a hollow rotatable member positioned in the container neck and rotatable by turning the cap. The rotatable member is provided with an end wall having a hole therethrough. A fixed member is supported adjacent said end wall and on the outside thereof, and a rotatable disc is supported by said rotatable member on the outside of said fixed member. The fixed member and the rotatable disc both have holes therethrough and the hole in the disc is adapted to receive a pill from the supply in the container when the container is inverted. The pill is transferred from the hole in the disc into the hole in the fixed member and from the latter hole into the hole in the hole in the rotatable end wall of the hollow member when the cap is turned. The pill may be removed from the hollow member after the cap is removed from the container, and the cap must be placed back upon the container before the device can be used to dispense another pill.

3,730,388

MATERIAL MEASURING AND DISPENSING APPARATUS

Louis Bender, Scotch Plains, N.J., assignor to Brenner & Bender Inc., Warren Township, N.J.

Filed Feb. 10, 1972, Ser. No. 225,074
Int. Cl. B65g 59/00
U.S. Cl. 221—68 28 Claims



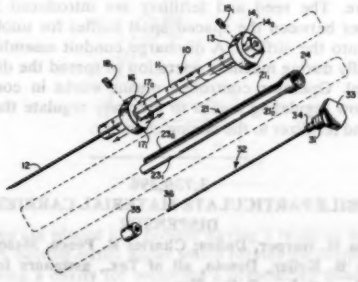
An apparatus for dispensing materials such as pills, coffee, sugar and the like is described wherein precise desired quantities may be dialed into the apparatus and quickly and accurately dispensed. In a preferred embodiment for a pill counter and dispenser, a plurality of channels are provided with a flexible channel selector located to fill selected channels with pills to be dispensed. The channels each contain a predetermined number of pills so that, upon actuation of a pill gate, the desired quantity of pills is dispensed. A unit pill dispensing feature is included to enable the dispensing of any desired quantity of pills within a practical range. An interlock operable between the pill gate and the channel selector protects against the spillage of pills. Several embodiments are shown to provide pill counters capable of dispensing a variety of pill shapes such as large tablets and capsules. Pill counters for either mounting on bottles or for mounting on a surface in a self-contained manner are described.

3,730,389

SYRINGE

Rano J. Harris, Sr., and Rano J. Harris, Jr., both of Baton Rouge, La., assignor to Precision Sampling Corporation, Baton Rouge, La.

Filed June 22, 1971, Ser. No. 155,570
Int. Cl. B67d 5/22
U.S. Cl. 222—31 12 Claims



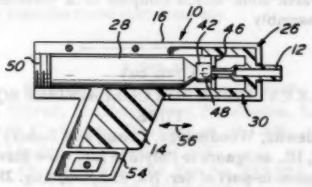
An improved syringe for dispensing accurately measured quantities of fluid specimens. It comprises a unique plunger and plunger guide assembly, adapted for engagement with a pair of ferrules fitted upon a syringe barrel, in addition to the usual combination of a barrel and a hollow or tubular needle mounted on the forward end of the barrel such that the axial opening of the barrel and the needle opening are communicated to provide a continuous bore. A pair of ferrules, each provided with a plurality of openings (preferably two) of equal number, are fitted upon the barrel, one to the rear and one to the front of the barrel. The openings of the ferrules are aligned. The forward ferrule is adjustably movable upon the barrel, while the other is fixed. The rearward ferrule is provided with openings which subtend a larger arc distance than those of the forward ferrule. The plunger guide, a sub-component of a plunger assembly, comprising a plunger and a plunger guide, is mounted upon the barrel for slidable engagement therewith, via projections corresponding to the number of openings within the ferrules, which are extended through the openings of the rearward ferrule. In one position the terminal ends of members located on the plunger guide will impinge on the front ferrule, this corresponding with a preselected setting of the volume of a fluid specimen to be delivered, and in another position the entire plunger assembly can be partially rotated upon the barrel and within the openings of the rear ferrule so that the members of the plunger guide can pass through the openings of the forward ferrule such that the plunger can then be pushed forward to deliver the fluid specimen through the needle.

3,730,390

AEROSOL GUN

Robert G. Adrian, and Claire M. Adrian, both of Camden, N.J., assignors to Tear Gas Products Corp., Pennsauken, N.J.

Filed June 23, 1971, Ser. No. 155,989
Int. Cl. B67d 5/54
U.S. Cl. 222—79 2 Claims



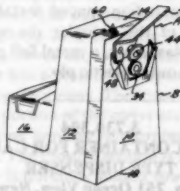
An aerosol gun which utilizes a replaceable cartridge or canister. The gun is constructed of two half sections and a reciprocably mounted trigger means. Aerosol gun may be advantageously used as a defensive weapon by using an aerosol cartridge containing tear gas.

3,730,391

OPEN CYLINDRICAL CAN CONTENTS EJECTING DEVICE

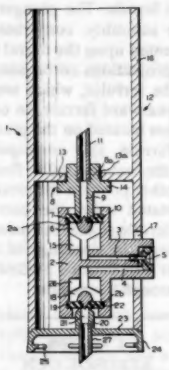
Richard M. O'Bannon, 188 Coral View, Monterey Park, Calif.

Filed Dec. 30, 1971, Ser. No. 214,041
Int. Cl. B67b 7/38
U.S. Cl. 222—82 6 Claims



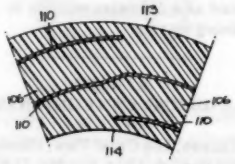
A device for ejecting the dimensionally stable contents of an opened cylindrical can as an integral unit, and one that is particularly adapted to be included as a part of an electrically operated can opener, with both the device and the can opener being powered by the same electric motor.

3,730,392
COUPLER-ASPIRATOR-VALVE ASSEMBLY
Jean Marand, Norwalk, Conn., assignor to Ciba-Geigy Corporation
Filed Aug. 3, 1970, Ser. No. 60,687
Int. Cl. B67b *7/24*; B67d *5/54*
U.S. Cl. 222—82 **17 Claims**



A coupler-aspirator-valve assembly includes a coupler-aspirator having two flow passages joining in a nozzle. Each flow passage communicates with a chamber. One of the chambers houses a valve stem which couples to a valveless propellant cartridge. The other of the chambers houses a product container valve stem which couples to a valveless product container assembly.

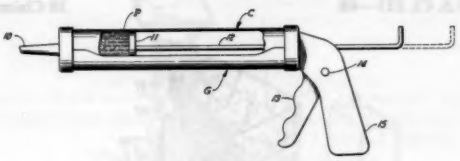
3,730,393
FLEXIBLE CYLINDER FOR COLLAPSIBLE SQUEEZE TUBE
William Ledewitz, Woodbridge, Conn., and Robert W. Twigg, Rockford, Ill., assignors to Polytube Inc., New Haven, Conn.
Continuation-in-part of Ser. No. 853,858, Aug. 28, 1969, abandoned. This application Aug. 20, 1970, Ser. No. 65,415
Int. Cl. B65d *35/10*
U.S. Cl. 222—106 **3 Claims**



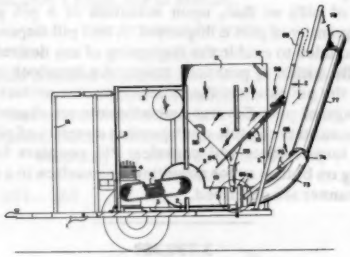
A flexible cylinder which is adapted to be used as the body of a squeeze tube is disclosed. The cylinder has a gas-pocket free multi-ply wall including spaced metal foil plies. Along each radial section of the cylinder the wall comprises, in sequence, an inner plastic ply, a metal foil ply, a plastic ply, a metal foil ply, and an outer plastic ply.

3,730,394
PUTTY MIXING CONTAINER FOR CAULKING GUN-TYPE DISPENSER
Kenneth W. Woodson, 251 Ocean View, Newport Beach, Calif.
Filed Sept. 28, 1970, Ser. No. 76,087
Int. Cl. B29b *1/04*
U.S. Cl. 222—137 **33 Claims**

A putty mixing container of the disposable type in which an epoxy putty and a catalyst are separated from one another on opposite sides of a mixer by a removable barrier. The putty and catalyst are mixed by rotation of the mixer after removal of the barrier. The mixer is removable from the container to allow dispensing of the mixed material or the mixer is of deformable construction to enable dispensing of the mixed material.



3,730,395
SEED AND FERTILIZER SPREADER
Donald R. Gallogly, Route 2, Box 232, and William E. Wheeler, 610 3rd Avenue, both of Sweet Home, Oreg.
Filed July 21, 1971, Ser. No. 164,614
Int. Cl. B67d *5/60*
U.S. Cl. 222—145 **1 Claim**

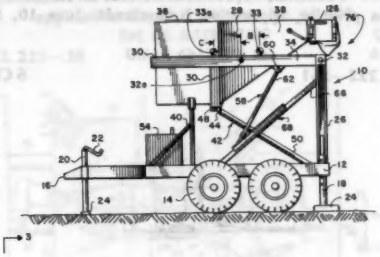


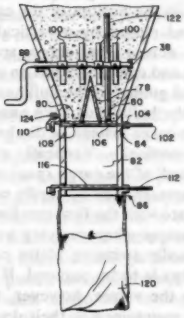
A machine is disclosed for travel along a linear course while simultaneously projecting seed and fertilizer for deposit along an area adjacent said course. A blower provides an airflow which passes through a mixing chamber whereat baffles, spaced in the direction of airflow, produce an area of reduced pressure. The seed and fertilizer are introduced into said chamber between the spaced apart baffles for unobstructed entry into the airflow. A discharge conduit assembly moves vertically during machine operation to spread the discharged material. Operator controlled means works in conjunction with flow regulating means to precisely regulate the flow of seed and fertilizer to the mixing chamber.

3,730,396
MOBILE PARTICULATE MATERIAL CARRIER AND DISPENSER
William H. Harper, Dallas; Charles R. Peace, Mesquite, and Jake B. Keller, Desoto, all of Tex., assignors to A.M.H. Equipment, Inc., Dallas, Tex.
Filed May 28, 1971, Ser. No. 147,993
Int. Cl. B67d *5/64*
U.S. Cl. 222—166 **1 Claim**

A bulk material dispenser having a receptacle rotatably supported on a wheeled frame with an access opening in the receptacle for filling the receptacle with particulate material.

A hydraulic pump connected to a double acting telescoping hydraulic piston cylinder assembly pivotally mounted between the frame and the receptacle for rotating the receptacle between a first loading position and a second dispensing posi-





tion. A dispensing opening in said receptacle for controlling the discharge of material from said receptacle. Baffles and material agitators in said receptacle to assist the dispensing of the particulate material.

3,730,397

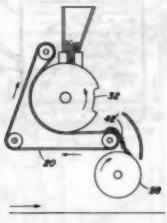
GRANULE APPLICATOR

Bruno E. Magnus, Dunellen, N.J., assignor to GAF Corporation, New York, N.Y.

Filed Oct. 2, 1970, Ser. No. 77,561

Int. Cl. G01f *11/24*

U.S. Cl. 222—254 **1 Claim**



Granules are placed in a hopper having a resilient seal surrounding a bottom outlet under which rotates the periphery of a roll having a cavity for receiving a preselected quantity of such granules each time the cavity passes under such outlet. The cavity roll in turn drives a belt carried by idler rolls located so that the belt contacts the cavity roll directly after the periphery of such roll leaves the hopper outlet seal, and such contact continues until the belt reaches the bottom of the roll, where a horizontal reach of the belt carries the granules to a discharge station above a distribution roll. From such distribution roll the granules fall under a gate onto a sheet of roofing material which moves horizontally thereunder.

3,730,398

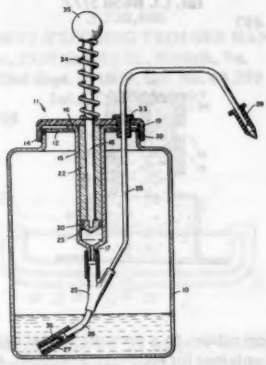
LIQUID DISPENSING APPARATUS

George G. Goda, 390 First Avenue, New York, N.Y.

Filed June 14, 1971, Ser. No. 152,637

Int. Cl. G01f *11/06*

U.S. Cl. 222—309 **12 Claims**



A combination syringe and cap assembly which is utilized for dispensing predetermined amounts of liquid from a source bottle. The assembly is of compact and concise construction and can be manufactured inexpensively.

3,730,399

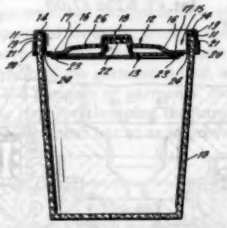
NON-SPILL DRINKING CUP TOP

James W. Dibrell, Malibu; James Pennington, Los Angeles, and Frank C. Schutz, Downey, all of Calif., assignors to Nospital Limited, Los Angeles, Calif.

Filed Feb. 22, 1972, Ser. No. 227,993

Int. Cl. B67d *3/00*

U.S. Cl. 222—482 **3 Claims**



A non-spill drinking cup cover is formed of two sections joined at their center. The outer cover section can be secured to the outer periphery of a drinking cup in a conventional manner. The outer cover section further contains an annular well which in turn has a plurality of openings and at least one annular reinforcing rib means. The inner closure section nests within the central portion of the cover section and additionally contains at least one annular reinforcing rib means near the periphery thereof. The closure section is stressed such that the periphery thereof is normally biased toward contact with the bottom of the annular well of the cover section along a closed line such that all openings of the cover section are between the line of contact and the central portion of the cover section so as to form a fluid-tight seal. The cover section is more elastic than the closure section so that upon application of pressure,

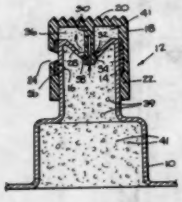
the cover section will undergo elastic deformation so as to open the contact between the cover section and closure section and allow fluid to flow through the holes into the annular well. The user may then drink from any annular position on the rim of the outer annular well.

3,730,400

PRESSURE PACKAGES

Kenneth G. Klema, Racine, Wis., assignor to S. C. Johnson & Son, Racine, Wis.

Filed March 2, 1972, Ser. No. 231,301
Int. Cl. B65d *5/72*
U.S. Cl. 222—497 **8 Claims**



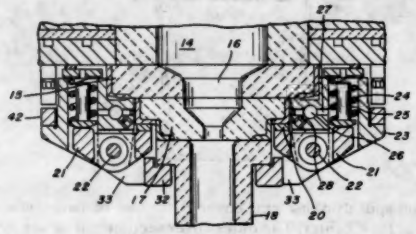
This invention relates to a pressurized package of the class embodying a container for receiving a product, and propellant means in the container for discharging the product therefrom, said container having discharge means characterized by a cap mounted on said container for opening or closing an exit opening in the container depending upon the relative position of the cap, and a pressure chamber interposed between the cap and the container for returning the cap to its closed position with respect to the exit opening.

3,730,401

APPARATUS FOR SUPPORTING AND OPERATING A SLIDABLE GATE AND EXTENDED TUBE NOZZLE ON A BOTTOM-POUR VESSEL

Charles H. Bode, Jr., Upper St. Clair Township, Allegheny, Cty., Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed March 22, 1972, Ser. No. 236,921
Int. Cl. B22d *37/00*
U.S. Cl. 222—512 **12 Claims**



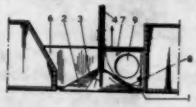
A bottom-pour teeming vessel for pouring molten metal into a mold is provided with a slidable gate for controlling the flow of metal and a nozzle extension tube fixed below the gate. A nozzle plate is secured to the vessel bottom and the gate is urged thereagainst by spaced rails mounted on spring-loaded rocker arms on opposite sides of the nozzle. The tube is ruged against the underside of the gate by a separate set of spaced rails mounted on spring-loaded rocker arms. The gate and tube are free to slide relative to each other. Means are provided for changing the gate and tube simultaneously or either one separately without disturbing the other.

3,730,402

HOPPER CRAFT

Cornelis Van der Gaag, Delft, Netherlands, assignor to N.V. Industrieele Handelscombinatie Holland, Rotterdam, Netherlands

Filed June 10, 1971, Ser. No. 151,738
Claims priority, application Netherlands, June 10, 1970, 7008447
Int. Cl. F16k *51/00*
U.S. Cl. 222—561 **6 Claims**



A hopper craft has a cargo space and a plurality of discharge openings in the bottom of the cargo space each of which is opened and closed by a vertically movable valve. Bulkheads extend across the cargo space between the discharge openings; and each valve has an upright plate that is perpendicular to and guided in the bulkheads. On one side of the upright plates, the bulkheads have passages therethrough for pumping out the cargo instead of discharging the cargo by moving the valves vertically. Vertically swinging plates are pivoted to the side wall of the cargo space on the same side as those through passages. In their upwardly swung positions, the latter plates cooperate with the first-mentioned plates to close off the through passages when carrying a cargo that is to be pumped. The vertically swinging plates can then be swung down when the cargo is to be pumped. If the cargo is to be discharged through the valves, however, then the vertically swinging plates are maintained in their down position during loading so that all the cargo space is available.

3,730,403

MILK KETTLE FOR DOMESTIC USE

Aldo Piagnoli, Via Nino Bixio, 4/15 A sc. D, 16128 Genova, Italy

Filed June 16, 1970, Ser. No. 46,752
Claims priority, application Italy, June 16, 1969, 7105 A/69
Int. Cl. D65d *25/44*
U.S. Cl. 222—572 **5 Claims**

A kettle for heating and boiling milk, and consisting of a substantially conventional vessel having side and bottom walls, and further provided with a partition wall parallel to and spaced from the said bottom wall at a level generally of the order of one tenth of the overall height of the vessel, said partition wall being apertured at a position formed adjacently to a brief arc of the side wall, the area of the thus formed passage being generally from two to five percent of the area of said partition wall, the kettle being designed to effectively prevent boiling over of the milk.

3,730,404

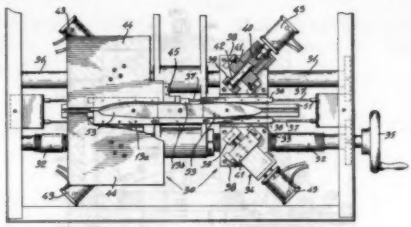
APPARATUS FOR FORMING FABRIC BLANKS

Ernst Schramayr, 4 Place Dubois, Dollard des Ormeaux, Quebec, and Wolfgang Geisinger, 180 Paradis Street, Rosemere, Quebec, both of Canada

Substitute for Ser. No. 841,884, July 15, 1969. This application Aug. 3, 1970, Ser. No. 60,420

Int. Cl. A41h *33/00*

U.S. Cl. 223—38 **4 Claims**



A nest plate assembly for an apparatus for forming fabric blanks comprising a nest plate having two end portions and a removable intermediate portion which may be made in various lengths for forming blanks of various sizes. The nest plate is supported by a carriage assembly including two separate supporting structures holding the end portions of the nest plate, and means are provided for moving the supporting structures for sliding the two end portions of the nest plate towards or away from each other for positioning a predetermined intermediate portion of the nest plate between the end portions thereof. The nest plate has a cavity shaped in accordance with the finished blank and a punch assembly is provided for inserting a somewhat larger blank into the cavity of the nest plate. The punch assembly comprises four punch sections overlapping each other and arranged to form a four corner punch assembly, A head structure is provided for supporting the punch assembly and includes two separate plates slidably mounted towards or away from each other. To each one of such plates are attached two punch sections for permitting adjustment of the length of the punch assembly to suit the length of the nest plate assembly. Screw means are secured to the head structure and connected to the plates for easily adjusting the length of the punch assembly.

3,730,405

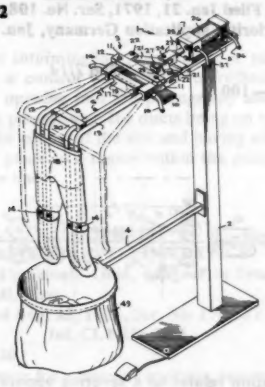
HOSIERY INSPECTION APPARATUS

Melvin H. Ezell, 813 Romany Road, Charlotte, N.C., and Troy B. Talley, Route 4, Concord, N.C.

Filed June 22, 1971, Ser. No. 155,578

Int. Cl. D06c *15/00*

U.S. Cl. 223—72 **17 Claims**



Apparatus for holding tubular garments during inspection which includes pairs of garment-holding elements having downturned ends which are inserted into the garments, the outer holding elements of each pair being pivotally mounted upon a support for horizontal movement, and pneumatic means for moving the pivoted elements about their pivots to a diverging relation to spread and hold the garments and to a substantially parallel relation to release the garments. A garment packaging receptacle is held below the garment being inspected, and a burst of air through the pivoted holding elements into the garment positively ejects the garment from the holders. The air release is under control of the means for moving the holding elements toward one another.

3,730,406

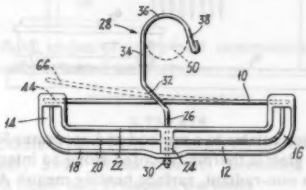
GARMENT-EXPOSING TROUSER HANGER

John J. Sullivan, 3920 Granby St., Norfolk, Va.

Filed Sept. 3, 1970, Ser. No. 69,259

Int. Cl. A47j *51/097*

U.S. Cl. 223—95 **5 Claims**



A trouser hanger adapted to support without slippage a folded pair of trousers from a clothes bar or rail, in side-by-side relation to a plurality of other similarly supported trousers, all in such a manner that the uppermost or folded portion of the trousers is visible from a viewpoint in front of and above the supporting clothes bar or rail, thereby to apprise a user of the color and nature of the fabric of the trousers. The device comprises a pair of substantially parallel, spaced horizontal bars disposed one above the other with a hook member attached to the center of the lower bar and extending upward past the upper bar and having a curved upper terminus adapted to be placed over the garment rail. The bars are mounted or secured to each other at their ends, in such a manner that one end of the upper bar can be temporarily separated from the lower bar for the purpose of sliding a folded pair of trousers on the upper bar to be supported thereby and to hang pendent therefrom past the lower bar. Due to the support of the trousers by the upper of the two bars, the fold of the trousers will be visible when the hanger is disposed on a garment rail alongside of a plurality of similar hangers and supported trousers, from a vantage point at the front of and above the rail. Thus, an instant determination of the color and fabric of the garment is had, without moving or shifting any of the hangers or garments. Non-slip means are provided on one bar, for clamping the supported trousers in cooperation with the other bar so as to prevent slippage of the trousers.

3,730,407

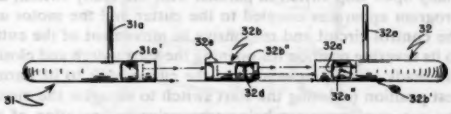
COMBINATION PACK AND COT

Winfield P. Russell, 27 Pine Grove St., Needham Heights, Mass.

Filed July 23, 1971, Ser. No. 165,665

Int. Cl. A45f *3/10*

U.S. Cl. 224—9 **6 Claims**



A combination pack and cot is provided by using a pack frame comprising detachable U-shaped members which serve

as the legs of the cot by supporting rods fitting into notches. The pack canvas can also serve as the cot webbing.

3,730,408

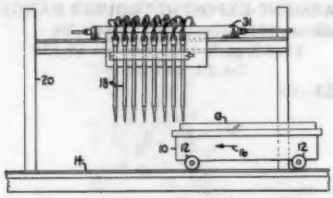
THERMALLY DIRECTED GLASS CUTTING

John R. Dahlberg, Jeannette; James L. Oravitz, Jr., Cheswick, and Edmund R. Michalik, West Mifflin, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sept. 15, 1970, Ser. No. 72,354

Int. Cl. B26f *3/06*

U.S. Cl. 225—2 **7 Claims**



This invention relates to a method and apparatus for cutting glass wherein glass is thermally scored along an intended path of cut, using a non-radiant, surface heating means. A fracture is then directed along the intended path by applying a bending moment about the thermal score.

3,730,409

DISPENSING APPARATUS

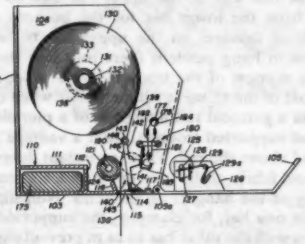
Ferruccio Ratti, Milan, Italy, assignor to Steiner Company Lausanne S.A., Lausanne, Switzerland

Filed March 22, 1971, Ser. No. 126,533

Claims priority, application Italy, March 28, 1970, 22653 A/70

Int. Cl. B26f *3/02*

U.S. Cl. 225—14 **20 Claims**



A dispenser comprises a cabinet having a supply roll of paper towel therein and an electric motor-driven dispensing roll frictionally engaging the towel web for advancing it through a dispensing opening past a movable cutter, the cutter being biased to a normal rest position and being movable to a severing position in response to the manual cutting action by a user, a control circuit including a normally closed start switch and a normally open ready switch connected in a series between the motor and an associated power source and a normally open stop switch in parallel with the ready switch, and program apparatus coupled to the cutter and the motor and the control circuit and responsive to movement of the cutter to its severing position for opening the start switch and closing the ready switch, movement of the cutter back to its normal rest position reclosing the start switch to energize the motor, the program apparatus being responsive to operation of the motor for sequentially closing the stop switch then reopening the ready switch and then reopening the stop switch to de-energize the motor.

3,730,410

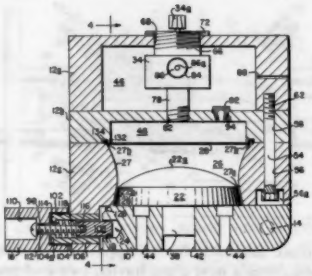
WAFER BREAKER

Thomas L. Altshuler, Delta Sigma Laboratory, 110 Hillcrest Road, Concord, Mass.

Filed June 16, 1971, Ser. No. 153,766

Int. Cl. B26f *3/00*

U.S. Cl. 225—96.5 **9 Claims**



A wafer breaker has a housing with upper and lower sections hinged together so that the upper section can swing down on top of the lower section. The lower section carries a removable platen having a rounded top surface on which a flat scribed wafer is placed. The top housing section contains a pressure chamber having a flexible and resilient wall which is positioned directly above the platen when the top section is in its closed position. Adjustment of a valve in the top section to a first operative position causes air under pressure to enter the pressure chamber and push the flexible wall against the flat wafer on the rounded platen thereby fracturing the wafer along the scribed lines. Following this, the valve is turned to a second position which slowly exhausts the air from the pressure chamber so that the wall resumes its unstressed state relatively slowly, thereby minimizing turbulence in the chamber containing the fractured wafer so that the resulting chips are not scattered.

3,730,411

SEVERING APPARATUS FOR SEVERING LENGTHS OF TUBE FROM A CONTINUOUSLY FED FLATTENED TUBULAR WEB

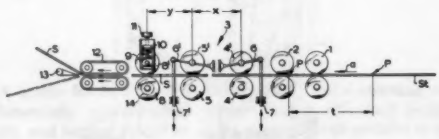
Friedrich Franz Brockmuller, 454 Lengerich of Westphalia, Germany, assignor to Windmoller & Holscher, Lengerich of Westphalia, Germany

Filed Jan. 21, 1971, Ser. No. 108,483

Claims priority, application Germany, Jan. 30, 1970, P 20 04 348.5

Int. Cl. B26d *7/14*

U.S. Cl. 225—100 **5 Claims**

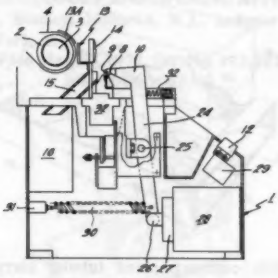


The invention relates to a severing apparatus for severing lengths of tube from a continuously fed flattened tubular web which is provided with transverse scorelines such as perforations at intervals along its length.

3,730,412
MACHINE FOR CUTTING TEETH ON SELECTOR COMBS FOR DRUMS AND OTHERS FOR KNITTING MACHINES

Jose Maria Dalmau Guell, San Bruno 103, Badalona, Spain

Filed May 13, 1971, Ser. No. 142,981
Claims priority, application Spain, May 16, 1970, 379,719
Int. Cl. B26f 3/00
U.S. Cl. 225—103 5 Claims

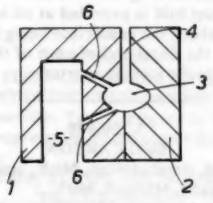


Apparatus for preparing pattern control elements for knitting machines by removing portions thereof which correspond to predetermined indications on a program, such as by removing teeth from a selector comb in a sequence indicated on a prepared program card.

3,730,413
INTERLACING JET

Peter McDermott, and Colin Campbell, both of Harrogate, Yorkshire, England, assignors to Imperial Chemical Industries Limited, London, England

Filed May 10, 1971, Ser. No. 141,714
Int. Cl. B65h 17/32
U.S. Cl. 226—97 3 Claims



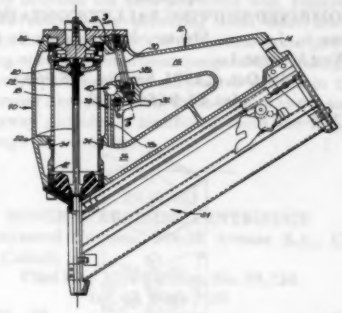
Apparatus for intermingling filaments in a yarn, the apparatus having a control passageway therethrough, a slot parallel thereto opening into the passageway and two ducts opening into the passageway, the ducts being on one side of a plane through the center of the slot and having axes converging through the plane to a region within the passageway and beyond its center line.

3,730,414
FASTENER APPLYING DEVICE

Carl T. Becht, Cincinnati, Ohio, assignor to Senco Products Inc., Cincinnati, Ohio

Filed Aug. 25, 1971, Ser. No. 174,677
Int. Cl. B25c 1/04
U.S. Cl. 227—130 14 Claims

Valving structure for a fastener applying device including a manually responsive member which is effective to initiate a working cycle by causing the main valve to open, and a pneumatically actuated member, effective after the main valve has opened to cause the main valve to close automatically and to maintain it closed even though the manually responsive member remains actuated. A passage including a check valve

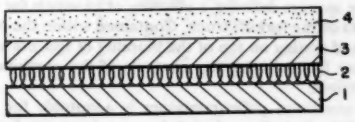


receives fluid under pressure and communicates with the pneumatically actuated member.

3,730,415
COMPOSITE FOR EXPLOSIVE BONDING

Ulf Richter, 5909 Wasserscheide, Germany, assignor to Dynamit Nobel AG, Troisdorf, Germany

Division of Ser. No. 1,333, Jan. 8, 1970, Pat. No. 3,672,033.
This application Dec. 10, 1971, Ser. No. 206,821
Int. Cl. B23k 21/00; B23p 3/02
U.S. Cl. 228—3 5 Claims

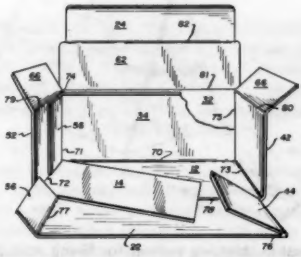


The present disclosure is directed to a laminated metallic composite and to a process for the production of said composites which comprises placing metallic spacers between the metal sheets to be bonded, said spacers being wound in a spiral shape from a wire with the axis of the spirals oriented substantially parallel with respect to the metal sheets, applying a layer of explosive to the upper sheet of metal and detonating said explosive to produce impingement and welding of the upper sheet with the remaining sheets.

3,730,416
SELF-LOCKING, DOUBLE WALL CONTAINER

William M. Pilz, III, West Chicago, Ill., assignor to Container Corporation of America, Chicago, Ill.

Filed Feb. 9, 1972, Ser. No. 224,846
Int. Cl. B65d 5/02
U.S. Cl. 229—16 A 3 Claims



A container formed from a unitary blank of foldable paperboard having six sides each of which is double-ply in thickness,

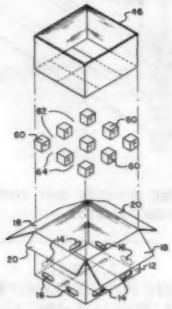
and which is completely self-locking so as to be free from a manufacturer's joint.

3,730,417

COMBINED SHIPPING PALLET/CONTAINER

De Wayne L. Lawson, Mentor, Ky., assignor to Olinkraft, Inc., West Monroe, La.

Filed Oct. 4, 1971, Ser. No. 185,960
Int. Cl. B65d *13/00*
U.S. Cl. 229—23 R 5 Claims



A combined shipping pallet/container for use in conjunction with a forklift truck and which comprises an outer paperboard container having a plurality of fork receiving openings contained in the lower portion thereof. The outer container has a plurality of spacers fixed to the bottom of the container with the spacers defining a plurality of channels for receiving the forks of the forklift truck. Contained within the outer container and resting on top of the plurality of spacers is an inner container for receiving the contents of the combination pallet/container.

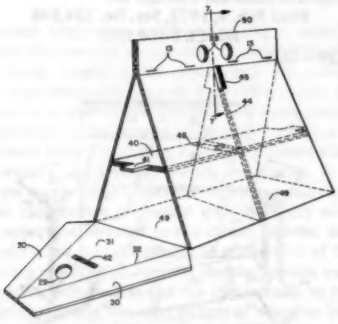
The combined pallet/container is adaptable for four-way entry of the forklift truck and the containers are designed for quick and easy stacking within a standard automotive truck or railroad car. The pallet/container may be shipped broken down as a storable package which may then be stored at the user's warehouse until the containers are set up for use in the user's business after which they can be again broken down and returned or stored for later re-use.

3,730,418

LIVING MATERIALS SHIPPING SYSTEM

William C. Spencer, Matalda, Pa., assignor to American Science and Engineering, Inc., Cambridge, Mass.

Filed April 12, 1971, Ser. No. 133,203
Int. Cl. B65d *5/48*
U.S. Cl. 229—27 R 2 Claims



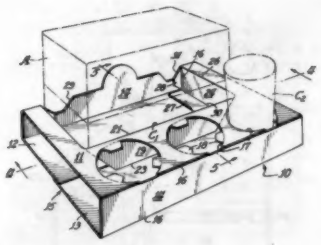
A disposable shipping system for living materials, such as small animals, includes a number of individual compartments placed in multiples of two or more in a carrying case that may be transported without injuring the animals.

3,730,419

CARRY-OUT TRAY

David L. Botterman, and Philip W. Lewis, both of Greensboro, N.C., assignors to Container Corporation of America, Chicago, Ill.

Filed July 14, 1971, Ser. No. 162,534
Int. Cl. B65d *5/48*
U.S. Cl. 229—28 1 Claim



A collapsible compartmented tubular carry-out tray is formed from a cut and scored blank of paperboard and comprises spaced and parallel top and bottom panels hingedly connected to spaced parallel side wall panels to define a tube. Prior to forming of the blank into a tube, the top panel is provided with apertures adapted to receive cups or the like and a single larger aperture for a larger sized article. The formation of said aperture is concomitant with the formation of partition structure extending between the top and bottom panels to give stiffness to the tube in both lateral and longitudinal directions.

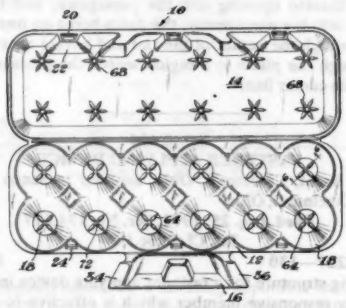
The partition structure includes a panel member connected to the top panel along a first fold line parallel to the longitudinal axis of the tube. The panel member has a glue flap foldably connected thereto and glued to the bottom panel. The partition structure also includes a second pair of panel members extending perpendicularly to the axis of the tube and perpendicular to the first panel member, this second pair of panel members having flaps lying along the bottom panel and including means for locking the ends of such flaps to the bottom panel. A gusset fold is provided at an end of the second pair of panel members, the gusset fold being folded from a top panel and urging the distal end of each of the second pair of panel members into the locking aperture.

3,730,420

EGG CARTON

Francis L. Burkett, Breckenridge, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 873,175, Nov. 3, 1969. This application Sept. 27, 1971, Ser. No. 184,166
Int. Cl. B65d *85/32*
U.S. Cl. 229—44 R 16 Claims



An egg carton formed from foam plastic sheet material, the carton having an improved highly effective latch construction

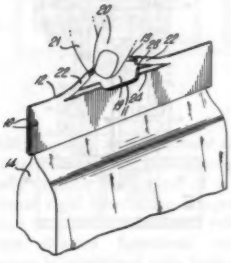
for securing the carton's lid closed with its tray portion. The tray carries a latching flap which folds over the front face of the cover after the lid is closed upon the tray. The flap carries lateraly projecting ears which snap into recessed pockets in the lid's front face. The carton carries rosette-type cushions shaped to cradle the eggs so as to reduce significantly egg movement when the carton is handled.

3,730,421

PACKAGE CLOSURE AND OPENING APPLIANCES

Alexander J. Stanley, Milltown, N.J., assignor to Nabisco, Inc., New York, N.Y.

Filed May 17, 1971, Ser. No. 143,951
Int. Cl. B65d *33/00*
U.S. Cl. 229—66 R **1 Claim**



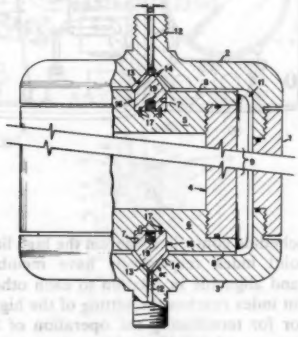
A strip of thin sheet closure material of length sufficient to encompass the flattened mouth portion of a packaging container has formed therein a longitudinal hinge break line comprising a crease or serration. A narrow and thin opening tape is firmly bonded to the strip on one side of the break line and with its sharp inner edge closely adjacent the said line. The break facilitates accurate folding of the closure strip over and sealing it to the sides of the container mouth portion, while during subsequent opening the sharp edged tape readily ruptures the closure strip along the break line, at the same time removing a narrow ribbon of the closure material on one side of the opening.

3,730,422

CONTINUOUS FLOW CENTRIFUGE WITH MEANS FOR REDUCING PRESSURE DROP

Nakwon Cho, Knoxville, Tenn., assignor to The United States of America as represented by the United States Atomic Energy Commission

Filed May 25, 1971, Ser. No. 146,758
Int. Cl. B04b *1/00*
U.S. Cl. 233—16 **8 Claims**



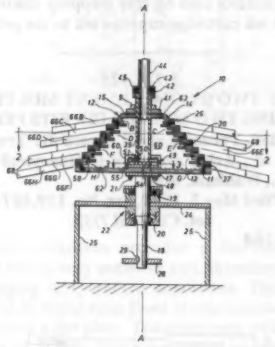
An intermediate speed, continuous flow, high capacity liquid centrifuge assembly characterized by a low pressure drop in the process liquid is described. The elongated, vertically oriented rotor contains a central, generally cylindrical core having radially projecting vanes defining a segmented annular cavity between the core and rotor wall. Hollow shafts support the rotor while providing axial inlet and outlet passageways for continuous flow of process liquid through the rotor during operation. Improved design of flow passages from the axial inlet passageway to respective sectors in the segmented annular cavity and from those sectors to the axial outlet passageway provides a significant reduction in pressure drops through the centrifuge.

3,730,423

MINERAL DRESSING CENTRIFUGE

Gordon Raymond Coulson, 309-38 Avenue S.A., Calgary, Alberta, Canada

Filed May 22, 1970, Ser. No. 39,730
Int. Cl. B04b *1/00*
U.S. Cl. 233—38 **9 Claims**



A method of mineral dressing and a mineral dressing centrifuge especially suited to the separation and beneficiation of fine metal values such as gold particles from suspensions of mixtures of said metal values and a gangue in a liquid medium. A suspension of the particulate mineral mixture in a suitable liquid medium is introduced generally axially into a rotating centrifuge and separated into its components by the settling rates of the components in the liquid medium under the influence of centrifugal forces. The components are separately discharged in liquid streams issuing from a plurality of discharge outlets and are separately collected. The centrifuge is of general frusto-conical configuration having an axial feed inlet for introducing the suspension into the larger end of the centrifuge and a plurality of axially and circumferentially spaced discharge outlets.

3,730,424

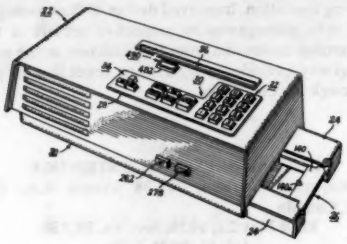
PUNCH AND PRINT DATA CARD RECORDER

George Hamlin Leonard, and Raymond J. Enyeart, both of c/o Varifab, Inc., 1700 E. Putnam Avenue, Greenwich, Conn.

Division of Ser. No. 33,800, May 1, 1970, Pat. No. 3,682,093.
This application Sept. 13, 1971, Ser. No. 180,032
Int. Cl. G06k *1/20, 1/08*
U.S. Cl. 234—130 **10 Claims**

The disclosed data recorder includes a control cam operating to impart oscillating motions to separate punch and print actuators. The punch actuator reciprocates a punch bail to depress individual punches selected by data entry solenoids through punch interposers, thereby to perforate a data card. A step cam oscillated by the print actuator operates against print interposers coupled to the solenoids to angularly orient a print wheel, thus to imprint on the data card the data characters

punched into the card. The data card is carried by a tray which is indexed through successive data entry positions in coordination with the control cam by tray stepping control apparatus. A replaceable ink cartridge supplies ink to the print wheel.



3,730,425

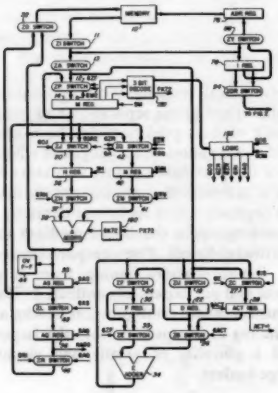
BINARY TWO'S COMPLEMENT MULTIPLIER PROCESSING TWO MULTIPLIER BITS PER CYCLE

Jerry L. Kindell, Phoenix, and Leonard G. Trubisky, Scottsdale, both of , Ariz., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Filed May 3, 1971, Ser. No. 139,487

Int. Cl. G06f *7/52*

U.S. Cl. 235—164 **4 Claims**



Multiplication apparatus is described which operates on 2's complement operands by a series of partial product formation cycles and generates the product of the operands in an accumulator register. For each cycle, a pair of the n multiplier bits is processed, right to left. On the basis of each bit pair configuration and the next multiplier bit, the accumulated partial product is shifted 2 bits right and a selected multiple (0, ½ or 1) of the multiplicand is added to or subtracted from the partial product accumulator register. Special initialization logic is restricted to loading the multiplier into an operand register, shifted one bit to the left, with a zero fill in the least significant bit position, and no special logic is required for correct termination after *n*/2 cycles, regardless of operand sign combinations.

3,730,426

THERMOSTATIC VALVE

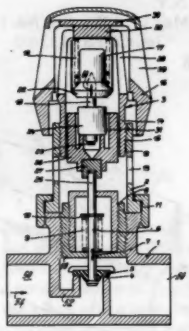
Heinz-Werner Braukmann, Mosbach/Baden, Germany, assignor to Brankmann Armatures AG, Rothrist, Switzerland

Filed Nov. 5, 1970, Ser. No. 87,242

Claims priority, application Germany, Nov. 13, 1969, P 19 56 991.6

Int. Cl. G05d *22/00*

U.S. Cl. 236—44 C **1 Claim**



A thermostatic valve includes a temperature responsive movable member and a humidity responsive movable member connected to a movable valve.

3,730,427

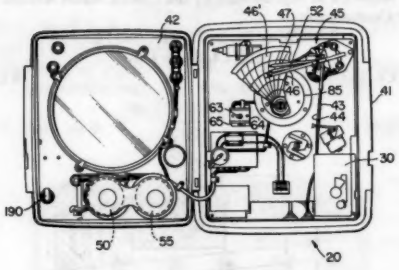
TIME SCHEDULE CONTROLLER AND PARTS AND SYSTEM THEREFOR

George T. Hardin, Knoxville, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Oct. 8, 1971, Ser. No. 187,641

Int. Cl. G05b *19/04*, *11/50*

U.S. Cl. 236—46 **10 Claims**

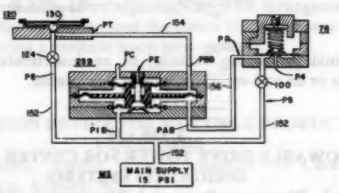


A time schedule controller wherein the high limit index and the set point index respectively have members movable therewith and alignable in relation to each other only when the set point index reaches the setting of the high limit index. An actuator for terminating the operation of the set point index in the rate of rise thereof is only actuated when the alignable members of the high limit index and the set point index that are operatively associated therewith are in their aligned relation thereof.

3,730,428
CONDITION RESPONSIVE PARAMETER CONTROL MEANS

Kenneth G. Kreuter, and Klaus P. Mueller, both of Goshen, Ind., assignors to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 884,947, Dec. 15, 1969, Pat. No. 3,575,343, which is a division of Ser. No. 594,851, Nov. 16, 1966. This application Jan. 22, 1971, Ser. No. 109,015
Int. Cl. G05b *11/50*; G05d *23/275*
U.S. Cl. 236—87 7 Claims

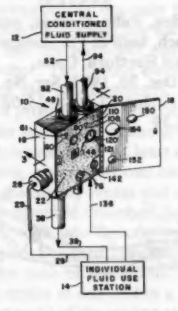


A unitary, multiple diaphragm structure is provided which includes integral valve means and flow passages, the structure being substantially entirely composed of a flexible resilient material. Additional rigid inserts are integrally molded into the basic structure to provide additional valving and seating arrangements for desired functional adaptability. The diaphragm structure is combined with hollow housing structures comprised of stacked plates or the like for mounting the peripheral portions of the multiple diaphragms of the unitary structure. Selective porting and pressure connections in the housing structures effect a family of differential pressure responsive modules or devices such as relays, comparators, and the like. A simplified temperature to pressure transducer is provided in which a compound bimetal spring selectively retains a spherical valve in an exhaust port to provide a modulated pressure output as a function of temperature changes. The transducer and family of differential pressure responsive modules are combined to provide a plurality of parameter control systems having a wide variety of operating modes. Several of the systems are convertible from one operating mode to another by merely changing the supply pressure magnitudes. The transducer is characterized by the fact that it requires no changeover adjustment to adapt it to the multiple modes of the systems.

3,730,429
FLUID DISTRIBUTION CONTROL DEVICE

Horace G. Minto, Tampa, Fla., assignor to Bay Mechanical Company, Tampa, Fla.

Filed May 27, 1971, Ser. No. 147,500
Int. Cl. G05d *23/00*
U.S. Cl. 236—94 7 Claims

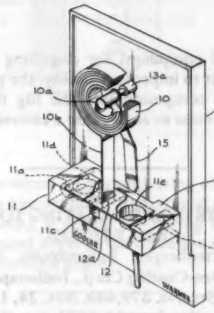


A device for directing conditioned fluid from a central conditioning station to an individual use station and directing the return of the fluid to the central conditioning station. A single, multi-purpose unit is contained within the device to provide a compact distribution control and information center to be installed within a conditioned fluid supply and use system.

3,730,430
THERMOVALVE

Gene W. Osheroff, Las Vegas, Nev., assignor to Fluidtech Corporation, Inglewood, Calif.

Filed July 6, 1971, Ser. No. 159,626
Int. Cl. G05d *23/08*
U.S. Cl. 236—101 7 Claims

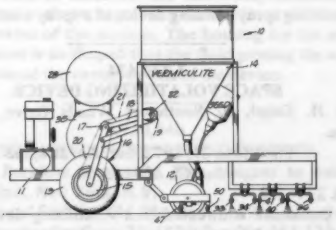


The present invention provides a thermostatically-controlled valve that is very sensitive and, therefore, very responsive to changing temperature conditions. The device comprises a coiled bi-metal strip fixed at one end and whose other end is coupled to a flat plate. The plate rests on a member containing a pair of orifices that are covered or uncovered by the plate as it moves horizontally under the rotational motion of the bi-metal strip. The sensitivity of the device is due to the fact that the plate barely loads the coil.

3,730,431
METHOD AND APPARATUS FOR HERBICIDE APPLICATION IN ROW CROPS

David M. Williams, Salinas, Calif., assignor to Bruce Church, Inc., Salinas, Calif.

Filed May 10, 1971, Ser. No. 141,709
Int. Cl. B05b *17/00*; B44d *1/08*
U.S. Cl. 239—1 6 Claims

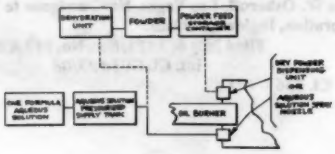


A wheeled chassis including dispensing equipment for row planting is also provided with three sets of herbicide dispensers: one for applying a herbicide between rows; a second for synchronous herbicide application in the rows between planting sites; and a third for synchronous application of a different herbicide onto the planting sites.

3,730,432
FOG DISPERSING COMPOUND

Clifton L. Bennett, 3404 Goldfinch, San Diego, Calif.

Filed Sept. 20, 1971, Ser. No. 181,701
Int. Cl. A01g 15/00
U.S. Cl. 239—2 R 2 Claims

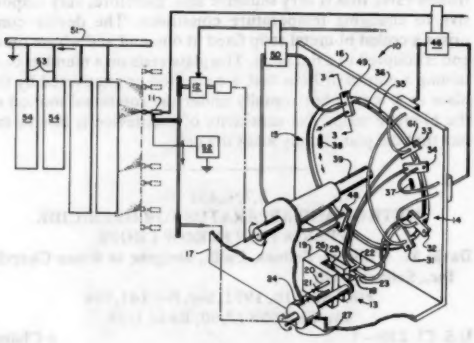


A process and equipment for dispelling fog from the atmosphere in order to improve visibility, the process consisting of discharging a compound into the fog that develop heat within the fog air mass so as to cause a convection current thus lifting the fog.

3,730,433
IMPROVEMENTS IN AND RELATING TO THE COATING OF ARTICLES

James A. Scharfenberger, Indianapolis, Ind., assignor to Ransburg Electro-Coating Corp., Indianapolis, Ind.

Continuation of Ser. No. 879,440, Nov. 24, 1969, abandoned.
This application June 14, 1971, Ser. No. 153,019
Int. Cl. B05b 5/00; F23d 11/28
U.S. Cl. 239—15 11 Claims



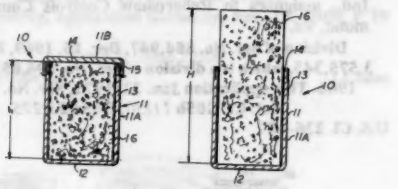
A fluidic apparatus for and a method of controlling the spray emission time and the direction of movement of a reciprocating spray emitting device of a spray coating system.

3,730,434
SPACE VOLATILIZING DEVICE

Walter H. Engel, 87 Southport Woods Drive, Southport, Conn.

Filed June 21, 1972, Ser. No. 264,863
Int. Cl. A24f 25/00
U.S. Cl. 239—47 7 Claims

This disclosure is directed to a volatilizing device for disseminating a volatile substance as a dry matter to the surrounding atmosphere in a controlled manner. The device includes a container which when closed contains a readily compressible shape of foamed urethane which has been impregnated with an aqueous emulsion of a volatile substance with the help of a surfactant in a manner whereby the volatile matter is gradually released when exposed to the atmosphere. The impregnated foam is rendered self-expandible to extend beyond the container opening when the cover is removed. The volatile matter which can be readily impregnated into the foamed urethane includes a fragrance producing volatile, or a

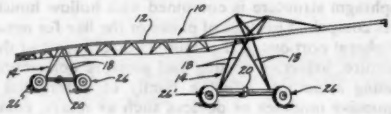


medicinal producing volatile, or an insecticidal producing volatile or an anti-microbic producing volatile.

3,730,435
TOWABLE DRIVE TOWER FOR CENTER PIVOT IRRIGATION SYSTEMS

Arthur L. Zimmerer; Bernard J. Zimmerer, and Paul B. Zimmerer, all of Lindsay, Nebr., assignors to Lindsay Manufacturing Co., Lindsay, Nebr.

Filed June 3, 1971, Ser. No. 149,457
Int. Cl. A01g 25/02; B05b 3/18
U.S. Cl. 239—213 8 Claims

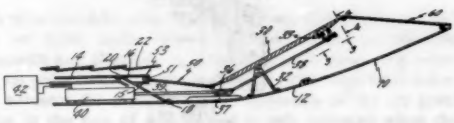


A towable drive tower for center pivot irrigation systems is disclosed herein which permits the system to be towed from one field location to another. A pair of gear boxes are selectively pivotally secured to opposite ends of the drive frame of each of the towers in the system. Each of the gear boxes has a drive wheel mounted on the output shaft thereof which may be selectively changed from a direct connection to a free-wheeling connection to permit the entire system, including the center pivot, to be towed longitudinally. A power means is connected to the input shafts of the gear boxes for driving the drive wheels. The gear boses and wheels connected thereto may be pivoted 90° from their normal operating position to a towable position. The drive wheels are then disengaged from their driving connection with the gear boxes. Each of the gear cases have an extended hub which supports the outer end of the output shaft.

3,730,436
SYNCHRONIZED EXHAUST NOZZLE ACTUATING SYSTEM

William M. Madden, Palm Springs, and Richard E. Teagle, North Palm Beach, both of Fla., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed Dec. 20, 1971, Ser. No. 209,664
Int. Cl. B64c 15/08
U.S. Cl. 239—265.39 8 Claims



A nozzle is formed on the exhaust end of a turbojet engine having four sets of flaps. One set of main flaps is pivotally located downstream of an exhaust opening, with a second set

of balance flaps pivotally connected between said main flaps and their rear end of the exhaust opening. A third set of diverging flaps are pivotally mounted to the main flaps and extend downstream thereof with the downstream end of said diverging flaps being pivotally connected at their rearward end to a fourth set of external flaps which are pivotally mounted at their forward end to the outer housing of the engine. The nozzle actuating system comprises an actuating device on each flap having a pair of output actuating arms means thereon along with an input actuating arm means. The input actuating arm means is controlled by a cylinder and piston unit so that all of the input arm means are moved together. The output actuating arm means are each connected to the adjacent edge of an adjacent flap. This arrangement extends from flap to flap around the entire circumference of the nozzle providing a variable hoop arrangement.

3,730,437

EJECTION DEVICE FOR MULTIPLE-PRODUCT DISPENSERS

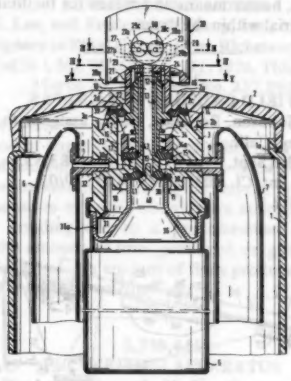
Felix Rousselot, Vienne, France, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed June 17, 1971, Ser. No. 153,948

Claims priority, application Germany, June 19, 1970, P 20 30 419.2

Int. Cl. B05b 7/28, 11/00

U.S. Cl. 239—306 **8 Claims**



An ejection device for producing a mixed spray of a product consisting of at least two fluid product components through aspiration and ejection by a gaseous propellant. An ejector housing has a manifold chamber therein and nozzle means therein. The nozzle means has at least two aspirating Venturi-type nozzle elements, one for aspirating each of the fluid products. Each nozzle has a convergent chamber having a narrower and opposite this a wider open end, which latter is in free communication with the manifold chamber, a divergent chamber having a narrower and opposite this a wider open end, and a neck portion connecting the narrower end of the convergent chamber and the narrower end of the divergent chamber with each other. The nozzle elements each have a product inlet between the two chambers. A mixing recess, open to the outside, is provided in a wall of the housing, into which recess the under open ends of the divergent chambers of all of the nozzle elements open. At least one duct means is provided in the housing, opening at one end in a wall of the housing spaced from the mixing recess and communicating at its other end with the manifold chamber, for the free flow of propellant gas therethrough into the convergent chambers of all of the nozzle elements. Separate conduit means is provided in the housing, one for each of the nozzle elements, each of which conduit means opens at one end in a wall of said housing spaced from the opening of the mixing recess and from the opening or openings of the duct means, and each of which conduit means is, at its other end, in communication with the product inlet of the neck portion of a different one of the nozzle elements.

3,730,438

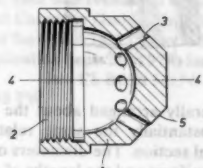
FUEL BURNER NOZZLE

Frank C. Howe, R7 Box 545, Bakerfield, Calif., assignor to Shell Oil Company, New York, N.Y.

Filed June 3, 1971, Ser. No. 149,679

Int. Cl. B05b 1/34

U.S. Cl. 239—490 **6 Claims**



In a pressure atomized oil burner having air louvers to swirl primary air, a long narrow flame is produced without reducing heat release by using a nozzle tip having cylindrical ducts drilled at a compound angle in the direction of the air swirl in addition to the main cone angle.

3,730,439

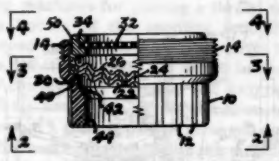
SINGLE NOZZLE FLUID DEVICE

Richard G. Parkison, 309 Monohan Drive, Louisville, Jefferson, Ky.

Continuation of Ser. No. 735,138, June 6, 1967, abandoned. This application Sept. 20, 1971, Ser. No. 182,263

Int. Cl. B05b 1/14

U.S. Cl. 239—590.3 **15 Claims**



This invention relates to a fluid flow device for a spout or a spout-end which is designed to produce a single laminar flow stream that is substantially splash-less at normal fluid flow rates. The device embodies a plurality of screens which are intimately in contact with each other and arranged to be spherical or concaval in shape, together with a strainer which is positioned up-stream of the screens. The housing for the screens and the strainer is so shaped that the fluid passing the screens is pointed-toward the center or axis of the device.

3,730,440

LAMINAR-FLOW SPOUT-END DEVICES

Richard G. Parkison, Louisville, Ky., assignor to American Standard Inc., New York, N.Y.

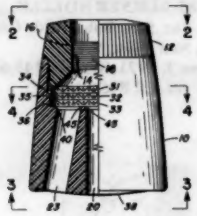
Continuation of Ser. No. 734,994, June 6, 1968, abandoned. This application Sept. 20, 1971, Ser. No. 182,121

Int. Cl. B05b 1/22

U.S. Cl. 239—590.5 **10 Claims**

This invention comprises a fluid flow device for producing a coordinated stream of fluid from a spout. The exiting stream will be substantially free of splashes when the exiting stream is flowing at normal velocities. The fluid flow device includes a body having a plurality of independent nozzles, which may be

seven in number, for example. In a preferred embodiment, one of the nozzle sections will be centrally disposed with its axis coinciding with the axis of the device, while the remaining nozzle sections will be spaced equally from the central nozzle



section and peripherally arranged about the central section and pitched at substantially the same relative angle with respect to the central section. The diameters of all of the nozzle sections will be uniform and the lengths of all of the nozzle sections will be substantially the same.

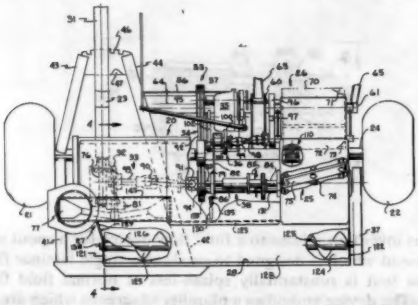
ERRATUM

For Class 241—282.1 see:
Patent No. 3,730,363

3,730,441
FORAGE HARVESTER

Thomas W. Waldrop; Robert A. Wagstaff, both of New Holland, and Joseph K. Weinlader, Akron, all of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

Filed April 29, 1971, Ser. No. 138,540
Int. Cl. B02c *18/06*
U.S. Cl. 241—60 **11 Claims**

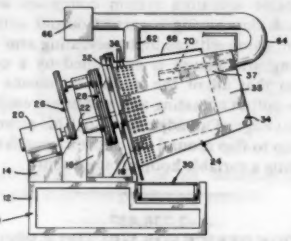


A forage harvester extending transversely to the forward direction of travel has a feed roll mechanism and cutterhead at the outboard end and a forage blower at the inboard end. A transverse auger delivers silage from the cutterhead to the blower. The feed roll mechanism feeds harvested crops received from a forwardly mounted pickup or row crop attachment to the cutterhead. The cutterhead has a rotating reel with blades to chop the harvested crop into silage. The transversely positioned forage blower is in substantial alignment with a rear connection for a forage wagon and a forward tractor hitch to set the position of an adjustable discharge spout on the forage blower to impel silage generally longitudinally into a trailing forage wagon. The fan of the blower is mounted on a rearwardly extending gearbox shaft coupled to the main input drive shaft which extends forwardly along the tractor hitch to the tractor power take-off. The feed roll mechanism and cutterhead are driven from the gearbox by a generally transversely extending drive which includes a reversing drive for rotating the reel in reverse on sharpening of the blades.

3,730,442
GRINDING APPARATUS

Clarence P. Harris, 328 Fountain Place, Burlington, N.C.

Filed Nov. 29, 1971, Ser. No. 202,826
Int. Cl. B02c *17/02, 17/10*
U.S. Cl. 241—60 **10 Claims**

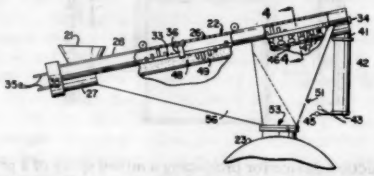


A driven drum having an octagonal shape is provided for grinding material placed therein. Aside portion of the drum is provided with openings therein and a closure plate slidable relative thereto normally closes the openings. The closure plate is provided with openings which may be aligned with the openings in the side portions by a cam arrangement to permit material within the drum to fall through the aligned openings upon rotation of the drum. The drum may be provided with exhaust means, heater means and means for facilitating grinding of the material within the drum.

3,730,443
FIELD CRUSHER FOR GRAPES

Wallace J. S. Johnson, Berkeley, Calif., assignor to Up-Right, Inc., Berkeley, Calif.

Filed Sept. 24, 1971, Ser. No. 183,333
Int. Cl. A01f *35/22*; A47j *19/02*
U.S. Cl. 241—82.1 **8 Claims**



An elongated tube in which an axially disposed shaft with helically arranged radial rods thereon rotates to convey harvested grapes through the tube, the rods acting to crush and remove stems from the grapes as they are so conveyed. The crushed grapes discharge from the tube through a flexible conduit into a tank filled with an inert, non-oxidizing gas to displace the gas upwardly into and through the tube, the gas filling the tube and exiting therefrom at the point where the grapes enter the tube so that the grapes are protected from oxidizing air after they enter the tube.

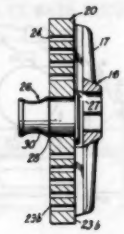
3,730,444
DOUBLE-CUT REVERSIBLE PLATE

William Clifford Pattillo, Stone Mountain, Ga., assignor to Southern Saw Service, Inc., Atlanta, Ga.

Filed April 28, 1971, Ser. No. 138,187
Int. Cl. B02c *18/36*
U.S. Cl. 241—82.5 **7 Claims**

A plate means having a pair of cutting surfaces with a plurality of apertures extending therethrough defining material extruding passageways. Means is provided for supporting the cutting surfaces adjacent a rotary blade means wherein the rotary blade means and the plate means are operable for

chopping material urged against the plate by a screw conveyor. The plate means includes a removable insert member adapted to be axially displaced relative to an opening formed in the plate. The insert member is detailed to be inserted in a selected one of two directions in the plate and includes an axially extending gripping surface. The insert member and the plate means are operatively associated with each other whereby the plate means is reversibly operable to present a selected one of the cutting surfaces adjacent the rotary blade means.



3,730,445

METHOD OF IMPROVING THE GRINDABILITY OF ALUMINA-SILICA ORES

Thomas E. Lee, and Frederick W. Frey, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 74,169, Sept. 21, 1970. This application March 24, 1972, Ser. No. 237,994

Int. Cl. B02c *23/00*

U.S. Cl. 241—23 **10 Claims**

A method of improving the grindability or grinding characteristics of aluminus clays or alumina-silica ores containing iron species by thermally treating the clays or ores at relatively high temperature in an air or oxidative atmosphere and subsequently grinding ore to a predetermined particle size, whereby the amount of fines produced on grinding are substantially less than the amount of fines produced upon grinding a comparable non-calcined ore.

3,730,446

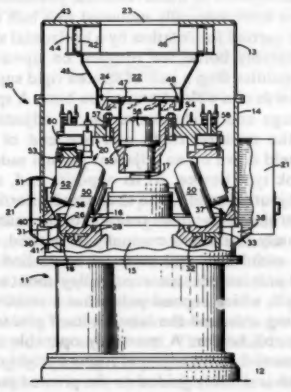
PULVERIZING APPARATUS

Robert R. Piepho, Wadsworth, Medina County, Ohio, assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed Oct. 21, 1971, Ser. No. 191,263

Int. Cl. B02c *4/02*

U.S. Cl. 241—110 **6 Claims**



A pulverizer of the type having a rotating lower ring engaged by a plurality of roller elements engaging a wear surface on the face of the ring, and the roller elements are rotated as a unit in the opposite direction to that of the ring about a common axis of rotation. Each roller element is supported by a driven ring with the assembly resiliently driven from a drive ring.

3,730,447

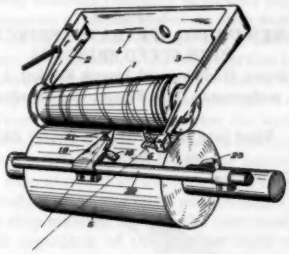
APPARATUS FOR USE IN CONNECTION WITH SPOOLING AND TWISTING MACHINES FOR PLACING A THREAD RESERVE ONTO THE WINDING BOBBIN

Gustav Franzen, Neersen near Krefeld; Klaus Nimtz, and Horst Riefers, both of Krefeld, all of Germany, assignors to Palitex Project Company GmbH, Krefeld, Germany

Continuation of Ser. No. 674,533, Oct. 11, 1967, abandoned. This application Sept. 30, 1970, Ser. No. 77,024

Int. Cl. B65h *54/34*

U.S. Cl. 242—18 PW **13 Claims**



The present invention concerns an apparatus for spooling and twisting machines for placing a thread reserve onto the winding-up bobbin of the spooling section with separate traverse thread guide. This apparatus moves the thread stepwise in the direction toward the center of the bobbin sleeve and finally conveys the thread to the traverse thread guide. The apparatus according to the invention is characterized primarily in that a guiding plate is arranged on one of the legs of the bobbin carrier or directly on the machine frame which guiding plate is provided with tooth-shaped cam means while the traverse thread guide has associated therewith at least one lifter member which during the reversing phase of the traverse thread guide catches below the thread and lifts the same and during the return movement in the direction toward the bobbin center conveys the thread to the next tooth space until the thread is freed from the guiding plate and is caught by the self-threading traverse thread guide.

3,730,448

WINDING MACHINES WITH PIVOTABLE RAIL-GUIDED TOGGLE TRAVERSING ROD GUIDES

Heinz Schippers; Erich Lenk, and Herbert Streppel, all of Remscheid, Germany, assignors to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Wuppertal, Germany

Filed March 30, 1970, Ser. No. 23,567

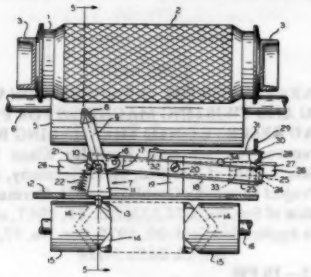
Claims priority, application Germany, April 1, 1969, P 19 16 580.1

Int. Cl. B65h *54/32*

U.S. Cl. 242—43.1 **6 Claims**

Winding machine for yarns, tapes, etc. with a traversing yarn guide embodying a toggle lever having one arm slidably guided in a pivotable guide rail, the pivotal position of which is variable in response to increasing winding package diameter and/or periodic rhythmic impulses of a reciprocating nature

and disengageable clutch means connecting said guide rail and adjusting members movable in response to increasing package

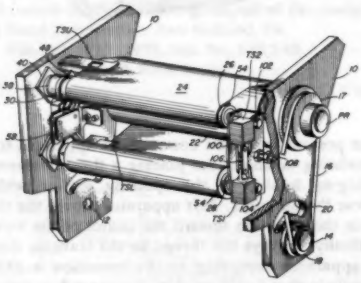


diameter, whereby flat-ended packages or conical-ended packages may be formed.

3,730,449
RIBBON REWINDING APPARATUS ESPECIALLY FOR HIGH SPEED PRINTERS

Wallace J. Satas, Hudson, and Joseph Konkel, Lynnfield, both of Mass., assignors to Data Printer Corporation, Cambridge, Mass.

Filed Sept. 10, 1970, Ser. No. 71,068
Int. Cl. B65h *25/26*
U.S. Cl. 242—57.1 **19 Claims**



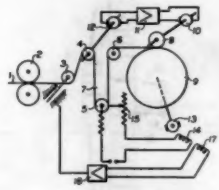
Ribbon rewinding apparatus includes a pair of reels between which the ribbon is serially wound, reversible intermittent reel-driving means, and reel-positioning means for guiding the ribbon as it is wound. Separate sensors detect the ribbon edge position adjacent to each reel for controlling the reel-positioning means. Other sensors detect the completion of the winding on either reel, and serve both to reverse the direction of winding, and to select one of the edge-sensors, which is adjacent to the reel that is winding the ribbon at any given time, to control the guiding function. A control circuit includes means for registering momentary actuations of the sensors to control the guiding and feeding operations. Signal generators also act through register means in the control circuit to discontinue ribbon feeding during halts in the operation of an associated printing machine, but permit the intermittent drive to complete a full cycle before disengagement occurs.

3,730,450
ARRANGEMENT FOR WINDING OF WEBS

Dietrich Hank, Leipzig, Germany, assignor to VEB Polygraph Leipzig, Leipzig, Germany

Filed July 24, 1969, Ser. No. 844,569
Int. Cl. B65h *17/12, 25/22*
U.S. Cl. 242—66 **3 Claims**

An arrangement of winding up webs having a predetermined web tension, which comprises a compensating roller movably arranged in a loop formed by the web, the movement of the compensating roller being utilized to regulate the winding speed. A draw-in roller is arranged in front of the loop of the web, the latter being loaded down by the compensating

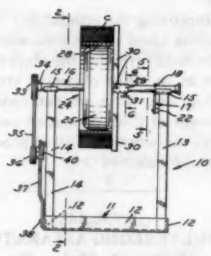


roller, and being driven proportionally. An air-squeezing roller produces the peripheral speed of the roller capable of driving the draw-in roller proportional to the peripheral speed of the roller.

3,730,451
INFLATABLE METAL COIL HOLDER

Michael D. Iddings, Petersburg, Mich., assignor to Delta Manufacturing, Inc., Detroit, Mich.

Filed July 8, 1971, Ser. No. 160,791
Int. Cl. B65h *75/24, 75/02*
U.S. Cl. 242—68 **15 Claims**

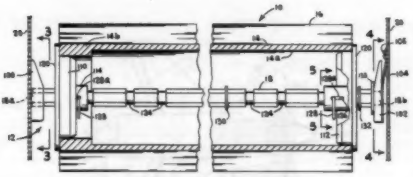


The holder features a center core or mandrel unit for mounting a pre-wound coil of strip metal stock, which unit is essentially comprised of a conventional pneumatic rubber automobile tire conventionally mounted to a hub disc. The tire and disc are carried for rotation by a horizontal shaft, which is in turn releasably borne for rotation on upwardly concave journalling saddles atop a pair of spaced rigid support posts or frame standards of a welded angle iron base. A spoke carrying coil end gauge and guide sleeve has an adjustably clamped mount on the mandrel shaft; and one end of the latter is releasably held down on an adjacent journal saddle by an adjustable hook type device. At its opposite end, and outboard of the other journal saddle, the shaft fixedly carries a belt pulley of a control unit by which rotation of the mandrel and coil is appropriately restrained manually as desired, and the tension of the withdrawn coil material controlled accordingly. Said control unit includes a second pulley about which the belt is also trained, which second pulley has a rotative pivot on a belt tensioning arm; and the latter is itself pivoted on a fixed base of the coil holder. A manually operable control lever pivotally mounted on an adjacent frame upright carries a control lug which is slidably guided on the pivoted pulley carrying belt tensioning arm, thus to vary the position of the latter, the tension on the belt and the resistance to rotation of the first pulley and the mandrel or core.

3,730,452
ELECTROPHOTOGRAPHIC COPY PAPER SUPPLY ROLL AND MOUNTING ASSEMBLY THEREFOR

Herman Schwartz, Wayne, N.J., assignor to Pitney Bowes-Sage, Inc., Hawthorne, N.J.

Filed April 12, 1971, Ser. No. 133,235
Int. Cl. B65h 19/02
U.S. Cl. 242—68.4 2 Claims

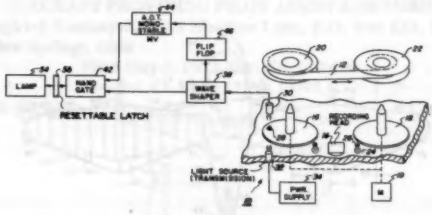


A mounting assembly for an electrophotographic copy paper supply roll employed in an electrostatic copier includes a spindle removably mounted against rotation by a pair of end brackets secured to the copier frame. The core of the supply roll has a stepped bore and is mounted for rotation on a pair of different diameter hubs adjustably axially keyed on the spindle for varying supply roll widths. The assembly insures proper orientation of the photoconductive coating on the copy paper relative to the copier while maintaining the supply roll centrally positioned in relation to the optical axis thereof.

3,730,453
EARLY END OF TAPE DETECTION

Stuart E. Hotchkiss, Williamson; Bruce H. Smith, Rochester, and Paul L. Stefko, Jr., East Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Sept. 21, 1970, Ser. No. 74,084
Int. Cl. G11b 15/54; B65h 25/32
U.S. Cl. 242—191 9 Claims

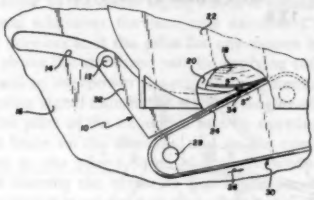


Apparatus for indicating a predetermined position on a recording medium such as a magnetic tape. Such a predetermined position is representative of the amount of usable recording medium remaining on a supply reel from which the tape is spooled. The apparatus is characterized by the provision of a photodetector for generating a series of pulses, the frequency of which varies in accordance with the change in angular velocity of the supply reel. The period between successive pulses generated by the photodetector is compared to the operating time of a one-shot multivibrator and when the former is equal to or less than the latter an output signal is derived which can be used to alert an operator that a predetermined quantity of tape remains or actuate control circuitry.

3,730,454
STRIPPER MECHANISM

Morris E. Brown, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed June 16, 1971, Ser. No. 153,656
Int. Cl. G03b 1/30, 1/42
U.S. Cl. 242—192 3 Claims

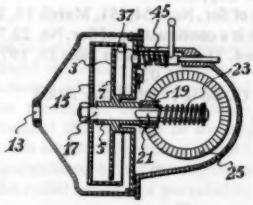


A stripper mechanism which is adapted to cooperate with a supply roll of strip material rotatably supported adjacent the mechanism to separate a leading end of the strip material from the supply roll includes a body portion and a tooth portion. The tooth portion is mounted on the body portion for limited rotation about an axis perpendicular to the axis of rotation of the roll. The body portion of the stripper member is supported for movement from a first location whereat the tooth portion is out of engagement with the roll to a second location whereat the tooth portion is in engagement with the outermost convolution of the strip material on the roll. Being free to rotate relative to the body portion, the tooth portion aligns itself with the plane of the strip material forming the outermost convolution of the roll regardless of the angular build-up of film caused by a single stripe of magnetic material on the film surface, thereby insuring positive, smooth pick-up of the free end of the strip material during film feeding operation.

3,730,455
FISHING REEL WITH DEPTH MEMORY

Joseph C. Murphy, 5817 East 57th Street, Tulsa, Okla.

Filed Dec. 29, 1971, Ser. No. 213,311
Int. Cl. A01k 89/00
U.S. Cl. 242—84.1 L 10 Claims



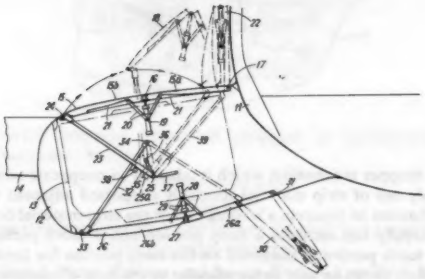
A fishing reel has a line lock which, when set, permits a certain length of line to be reeled in and then that same length to be unreeled again, so that the angler can return his lure to the same depth. The lock is in the form of a pin extensible over the periphery of the spool and over which the line is rewound. The rewound line can unwind, but further unwinding is prevented by the pin. The pin has a notch which engages with fixed structure in the extended pin position. A coil compression spring urges the pin to retracted position, and this same spring is anchored at one end in such a way to serve as a leaf spring to urge the notch in the pin about the fixed structure. The notch is so positioned that, when a cast is made to a relatively great distance, the weight of the cast lure will be sufficient to raise the pin against the action of the spring until the notch is disengaged, whereupon the same spring retracts the pin and the lock is thus automatically released.

3,730,456

AIRCRAFT WITH LIFT ENGINES

Alfred Arthur Morgan, St. Albans, England, assignor to Hawker Siddeley Aviation Limited, Kingston-Upon-Thames, Surrey, England

Filed April 14, 1971, Ser. No. 133,964
Claims priority, application Great Britain, April 14, 1970, 17,803/70
Int. Cl. B64c 29/00, 1/14
U.S. Cl. 244—12 B 7 Claims



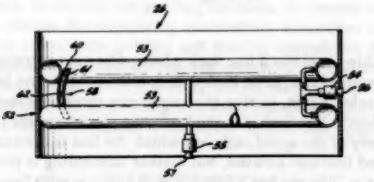
A VSTOL aircraft with lift engines disposed in rows along either side of the fuselage in sponsons, the sponsons having top intake doors and bottom efflux doors which doors comprise mutually articulated inboard and outboard sections so as to fold inward toward the fuselage when opened. Opening and closing movements of the doors are controlled by radius rods pivotally connected to the outer edges of the outboard door sections, the radius rods of the upper doors having the opposite ends carried on swinging links so that the center of movement of the radius rods changes during opening in order to avoid full opening of the doors being prevented by the fuselage side wall.

3,730,457

NUTATION DAMPER

Donald D. Williams, deceased, late of Inglewood, Calif. (by Gloria M. Williams, widow), assignor to Hughes Aircraft Company, Culver City, Calif.

Continuation of Ser. No. 534,251, March 14, 1966, abandoned, which is a continuation of Ser. No. 22,733, April 18, 1960, abandoned. This application June 29, 1970, Ser. No. 56,034
Int. Cl. B64c 17/00; G01c 19/04
U.S. Cl. 244—15 A 7 Claims



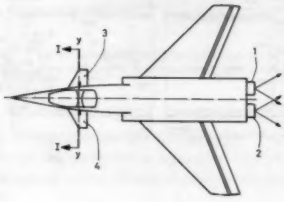
A viscous nutation damper for a spin stabilized satellite said damper comprising a sealed arcuate tube disposed near the periphery of the spinning satellite. Said tube is oriented generally parallel to the spin axis and is concave toward the spin axis. A viscous fluid and spherical steel ball are sealed within the tube.

3,730,458

JET-CONTROLLED AIRCRAFT WITH TRIM AND CONTROL FINS

Erich J. Haberkorn, Riemerling, Germany, assignor to Messerschmitt-Bolkow-Blohm GmbH, Munich, Postfach, Germany

Filed Oct. 15, 1970, Ser. No. 81,033
Int. Cl. B64c 9/34
U.S. Cl. 244—43 2 Claims



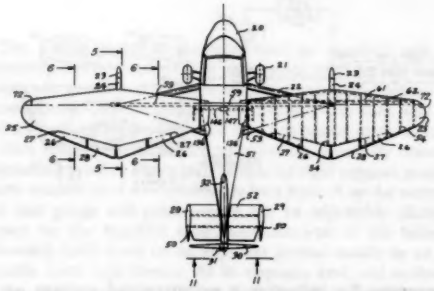
Control means for jet aircraft. In jet aircraft where the thrust jet is directly utilized for producing control moments, control fins are provided on the fuselage which are extended during takeoff and landings and also to some extent during subsonic flight but which are folded into the fuselage during normal flight. When so retracted, said stabilizing fins are received into suitable recesses in the fuselage to blend smoothly therewith.

3,730,459

AIRPLANE WITH FLOATING WING AND REVERSE PROPELLER THRUST

Daniel R. Zuck, 14273 Beaver St., San Fernando, Calif.

Substitute for Ser. No. 659,278, July 20, 1967, abandoned. This application Sept. 18, 1969, Ser. No. 860,170
Int. Cl. B64c 3/42
U.S. Cl. 244—48 15 Claims



This invention relates to aircraft, to the improvement in floating wing aircraft, to the improvement in the stability of floating wing aircraft at very low and negative lift angles of attack, to the improvement in aircraft having floating wings with non-stalling characteristics, and to aircraft with non-stalling characteristics employing the engine power to create a large variable aerodynamic drag force to vary and to precisely control the angle of descent of the aircraft and during landing of the aircraft.

3,730,460

JET-PROPELLED AIRCRAFT WITH MEANS FOR THRUST DEFLECTION

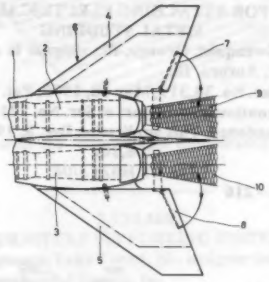
Andreas Mederer, Marktschwaben, Germany, assignor to Messerschmitt-Bolkow-Blohn GmbH, Munich, Germany

Filed Jan. 22, 1971, Ser. No. 108,809

Claims priority, application Germany, Feb. 13, 1970, P 20 06 596.7

Int. Cl. B64c *9/34*

U.S. Cl. 244—53 R 7 Claims



Jet aircraft having means for deflecting the thrust thereof for control purposes. Deflecting means are normally received into a suitable recess in structure adjacent the jet stream such as the horizontal stabilizer, the vertical stabilizer or the fuselage rearward of the jet output. Same are then actuated by any conventional means to extend the deflectors into the jet stream during slow speed operation of the aircraft and retracting same to permit during high speed operation of the aircraft all control functions to originate with the stabilizers, elevators and rudder. A further feature of the invention contemplates mounting the deflectors in a component movable with respect to the jet output, such as the elevators, with the elevators normally located below the jet output whereby the deflectors can be extended without entry into the jet stream at substantially level flight but will move gradually into the jet stream as said elevators are lifted during a landing operation.

3,730,461

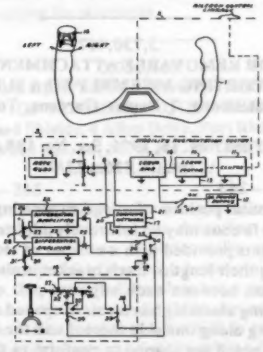
STABILITY AUGMENTATION SYSTEM FOR LIGHT AIRCRAFT PROVIDING PILOT ASSIST AND TURN

Siegfried Knemeyer, 1410 Meadow Lane, P.O. Box 123, Yellow Springs, Ohio

Filed May 5, 1971, Ser. No. 140,403

Int. Cl. B64c *13/18, 13/44*

U.S. Cl. 244—77 E 6 Claims



A small aircraft with a conventional stability augmentation system for automatically maintaining a wings level constant heading attitude is provided with a switch on the control wheel which is spring biased to a central neutral position and which is actuated by the pilot to the right or left of neutral and held in the actuated position to make a right or left turn. When actuated, the switch introduces an offset signal into the stability augmentation system causing the system to produce and stabilize on a turn rate determined by the magnitude of the offset signal. The actuated switch also sets up an additional signal of opposite sense to the offset signal which is substituted for the offset signal whenever the turn rate exceeds a preset maximum, as may occur if the pilot for any reason increases the turn rate above the stabilized rate by applying sufficient force to the wheel to overpower the stability augmentation system. The opposing signal causes the stability augmentation system to warn the pilot of the excessive rate by exerting a powerful backward force on the ailerons, and on the control wheel in opposition to the pilot's force, tending to reduce the bank angle and thereby the turn rate below the preset maximum. When the switch is released to its neutral position the stability augmentation system returns the aircraft to a wings level attitude.

3,730,462

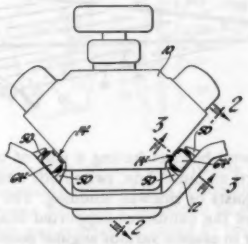
ENGINE MOUNT ASSEMBLY

Melvin E. Dick, Utica, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed April 26, 1972, Ser. No. 247,637

Int. Cl. F16f *15/00*

U.S. Cl. 248—10 5 Claims



An engine mount assembly for resiliently supporting an engine on a frame of a motor vehicle comprises inner and outer bushings between which resilient material is secured to control relative movement of the bushings in all directions. Brackets connect the bushings to the engine and the frame and also permit angular adjustment thereof. The outer bushing has a configuration such that the angular adjustment effects a change in the radial spring rate provided by the mount.

3,730,463

SHOCK ABSORBING MOUNTINGS FOR APPARATUS

Robert Richard, Zurich, Switzerland, assignor to Aktiengesellschaft Brown, Boveri & Cie, Baden, Switzerland

Filed April 20, 1971, Ser. No. 135,664

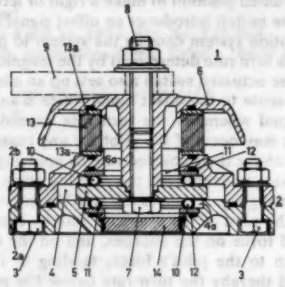
Claims priority, application Switzerland, May 6, 1970, 6791/70

Int. Cl. E04h *9/02*

U.S. Cl. 248—22 3 Claims

A damping arrangement for preventing mechanical shocks from being transmitted to the supporting foot portions of apparatus mounted on a foundation located at any area of the earth's surface susceptible to earthquakes includes a two-part resilient mounting. The lower part of the mounting is rigidly fixed to the foundation and the upper part, to which the foot portion of the apparatus is attached, is connected with the lower part by means of a self-centering annular rubber body

and a support plate which is guided for movement in any horizontal direction on the lower part by means of a low-friction type bearing placed therebetween in the form of a floating ring-shaped ball bearing retainer.



3,730,464

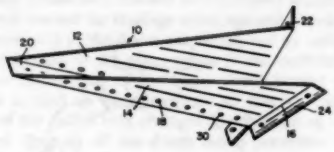
SHEET METAL BRACKET

Larry A. Kelly, Portugal Cove Road, P.O. Box 9004, Postal Station B, Saint John's, Newfoundland, Canada

Filed Jan. 25, 1971, Ser. No. 109,494

Int. Cl. F16m *13/00*

U.S. Cl. 248—57 **2 Claims**



A sheet metal bracket having a pair of triangular shaped plates supports an outlet box, switch box and the like on ceiling or floor joists or sidewall studding. The flexibility of the sheet metal of the cantilever supported bracket permits the plate member to assume various angular positions with respect to its mounting on the joists or studding. A plurality of longitudinally spaced apertures on the bracket permit various mounting locations and the optional use of non-metallic and conduit type wiring. A modified support uses two telescoping interlocking engaging brackets to provide a rigid support between two laterally spaced joists or studding.

3,730,465

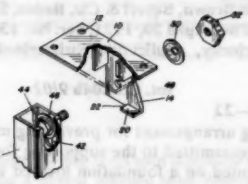
FOLDING LEG AND BRACKET

Allen C. Gonzalez, 16 Strong Place, Brooklyn, N.Y.

Filed Nov. 12, 1971, Ser. No. 198,243

Int. Cl. F16m *11/38*

U.S. Cl. 248—188.6 **7 Claims**



A one-piece bracket, preferably made as a stamping from a piece of sheet metal, is formed so as to have wing members providing two planes of support. These wing members provide retaining guides in which the end of a leg member may be slid in and out of engagement with the retaining guide portions of the bracket. These guide portions establish retaining means so that the leg may be positively mounted selectively in one of two positions usually at ninety degrees to each other. The bracket is preferably used with a square or rectangular metal tube leg member but may be configured to accommodate other tube configurations or solid members where two planes of contact are formed to complement rib configurations.

3,730,466

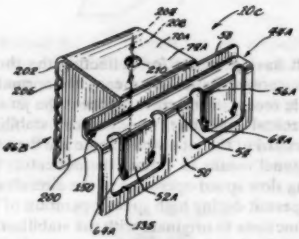
DEVICE FOR ATTACHING ELECTRICAL BOXES TO METAL STUDDING

Wesley W. Swanquist, Oswego, Ill., assignor to All-Steel Equipment Inc., Aurora, Ill.

Division of Ser. No. 38,319, May 18, 1970, Pat. No. 3,684,230, which is a continuation-in-part of Ser. No. 771,408, Oct. 29, 1968, abandoned. This application Dec. 8, 1971, Ser. No. 206,102

Int. Cl. H02g *3/08*

U.S. Cl. 248—216 **2 Claims**



The disclosure relates to a device for attaching switch boxes and the like to metal studding, for use on studding of the channel and stressed wire types, which is in the form of a mounting device including a clip portion in which the box is secured and a stud engaging portion that includes a planar flange defining an abutment portion adjacent its projecting end that is adapted to engage against one of two opposite surfaces of the stud, with the flange carrying a pair of spring arms that project outwardly therefrom and diverge outwardly thereof that each include a finger engaging portion at the projecting end thereof and an abutment forming toothed projection at right angles thereto that are spring biased against the other surface of the stud to clamp the stud portion bearing such surfaces between the flange abutment portion and the abutment forming projections. An alternate form of the device is disclosed that is arranged specifically for use on nailable steel studding.

3,730,467

MEANS FOR REMOVABLE ATTACHMENT OF A LOAD SUPPORTING ASSEMBLY TO A SURFACE

Leslie G. Dutchburn, 7 Devere Gardens, Toronto, Ontario, Canada

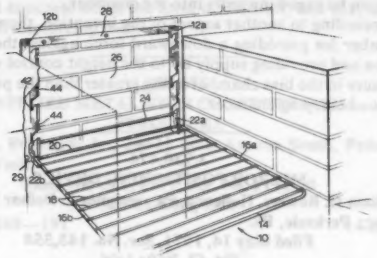
Filed Nov. 15, 1971, Ser. No. 198,635

Int. Cl. F16m *13/00*

U.S. Cl. 248—243 **4 Claims**

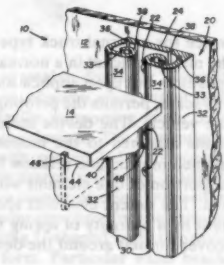
The horizontal position of a load supporting assembly such as a grill or a firebox may be selectively adjusted by means of a pair of brackets provided with a number of elongated notches spaced along their lengths. Each bracket is also provided with an indentation between each adjacent pair of notches. The load supporting assembly has a pair of spaced apart transverse bars extending along one side thereof and the indentation and a part of the notch are shaped to conform to the outside walls of the bars. The brackets are spaced apart on a surface such as an inner wall of a fireplace and the load supporting assembly is connected thereto by moving one bar into notches at the same

elevation of the brackets. The assembly is allowed to rotate under its own weight about the bar so that the other bar moves



into contact with the indentations immediately beneath the notches.

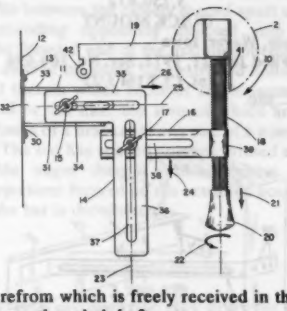
3,730,468
FURNITURE SUPPORTING SYSTEM
David L. Magnusen, Lake Forest, Ill., assignor to United States Gypsum Company, Chicago, Ill.
Filed Dec. 20, 1971, Ser. No. 209,792
Int. Cl. A47g *29/02*
U.S. Cl. 248—246 **27 Claims**



Bracket members and standards for hanging furniture elements from walls, the members and standards interengaging each other to permit the bracket members to be slid into an infinite number of vertical positions. Retention of the bracket members at any desired position is accomplished by loading the bracket member with a furniture element, the resultant binding between the bracket and standard being sufficient without the use of fasteners to retain said desired position. The bracket members are interchangeable between different modes of mounting the standards.

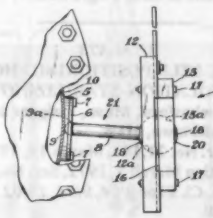
3,730,469
ADJUSTABLE DRAPERY SUPPORT WITH TWO MEANS OF VERTICAL ADJUSTMENT
George Edward Shields, 4 Allyn Drive, Port Richey, Fla.
Filed Dec. 10, 1971, Ser. No. 206,776
Int. Cl. A47h *1/124*
U.S. Cl. 248—265 **2 Claims**

A fixture for supporting draperies which allows for horizontal and vertical adjustment of the draperies. A wall bracket mountable to a wall has a horizontally extending plate member which adjustably receives a horizontal leg of an intermediate plate. The intermediate plate has a vertically extending leg with a vertically extending slot. An outer plate has a horizontally extending slot through which in conjunction with the vertical slot of the intermediate member a fastening device extends securing the outer plate to the intermediate plate. The intermediate plate is adjustable along the length of the vertical leg and has an outer threaded cylindrical end which is in meshing engagement with a screw threaded vertical shaft. A U-shaped wall which receives the drapery rod has a stem de-



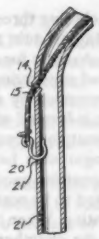
pending therefrom which is freely received in the hollow top end of the screw threaded shaft.

3,730,470
DEMOUNTABLE OPTICAL TOOLING SCALE FIXTURE
John S. Mitchell, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.
Filed Oct. 22, 1971, Ser. No. 182,769
Int. Cl. G01c *15/12*
U.S. Cl. 248—274 **12 Claims**



A demountable optical tooling scale fixture wherein a tooling ball is demountably attached by a connecting member and plate to a reference point on a surface to be measured and is positioned within and rotatably gripped by two plates set in a face-to-face relationship to each other; said plates are designed to receive optical tooling scales directly or by means of adaptors. In each case, the optical tooling scale will be positioned in a known spatial and angular relationship to the ball which in turn is held at a known distance from the point of mounting on the surface to be measured.

3,730,471
LANTERN HOLDER
Haze D. Edwards, 1175 Pinehurst Drive, Smyrna, Ga., and William L. Peck, 1194 Danner Street S.E., Atlanta, Ga.
Filed Nov. 13, 1970, Ser. No. 89,284
Int. Cl. F16m *13/00*
U.S. Cl. 248—274 **1 Claim**



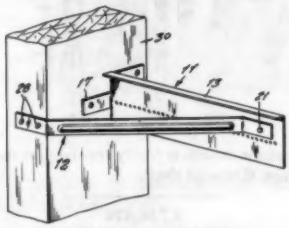
A device for supporting a lantern at any desired height from the water in order to attract fish by the light. The light consists

of a tubular member which is mountable within the oar lock of the boat.

3,730,472
QUICK MOUNT

Warren R. Dale, Wever, Iowa

Filed July 21, 1971, Ser. No. 164,696
Int. Cl. F16l 3/22
U.S. Cl. 248—300 **1 Claim**

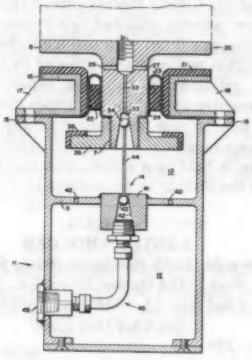


A holder that is readily attachable to a building construction and which is adaptable for mounting plumbing pipes or electrical components, the device consisting of two sheet metal straps that may be variously bent and variously attachable together or used alone to form a rigid holder.

3,730,473
PNEUMATIC SELF-POSITIONING SHOCK AND VIBRATION ISOLATION STABILIZING ABSORBER

Jerome S. Pepi, Chelmsford, Mass., assignor to Barry Wright Corporation, Watertown, Mass.

Continuation of Ser. No. 21,144, March 19, 1970, abandoned. This application March 3, 1972, Ser. No. 231,494
Int. Cl. F16f 9/04, 9/34, 15/02
U.S. Cl. 248—358 R **12 Claims**



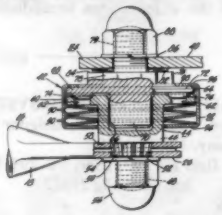
An isolation system including three discrete pneumatically controlled, self-positioning, shock and vibration isolators, each isolator including a chamber for air under pressure which acts as the isolator or load supporting chamber and provides an outlet to ambient, controlled by a position control valve. One wall of this chamber is formed with a tapered inlet opening to provide a valve seat for accommodating a ball inlet valve attached to a plunger of a height control valve. The other end of the plunger contains another ball serving as an air outlet valve, that is adapted to be seated in a tapered opening in the isolated body mounting. When the isolated body mounting moves inwardly into the chamber it presses on the upper ball to produce a force transmitted by the height control valve plunger upon the lower ball that opens the inlet valve to cause an increase of pressure in the chamber which serves to raise the isolated body mounting platform. When the platform rises, the outlet valve is opened by withdrawal of the outlet valve seat to reduce the pressure, and, in turn, causes the platform to again be urged inwardly into the chamber.

According to another aspect of the invention, there is a bias chamber for providing a downward force against the support piston and providing supply air to the height control valve, the pressure in the bias chamber being greater than the pressure in the load carrying chamber.

3,730,474
MIRROR POSITIONING DEVICE

William H. Bowers, Holicong, Pa., assignor to Delbar Products, Inc., Perkasie, Pa.

Filed May 14, 1971, Ser. No. 143,554
Int. Cl. B60r 1/06
U.S. Cl. 248—478 **14 Claims**

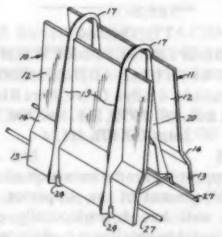


A positioning device for external truck type rear view mirrors which holds the mirror bracket in a normal outwardly extending operating position, but upon application of a predetermined force to the bracket, permits the pivoting of the bracket inwardly toward the vehicle. The device includes upper and lower detent elements attached to the mirror bracket arms which are axially aligned in rotatable relation by the cooperation of a cylindrical portion of one element with an axial bore of the other element. The detent elements are maintained in spring biased relation by a plurality of spring washers held in compression by a cover formed around the detent portions of the elements.

3,730,475
FORM FOR CASTING CONCRETE BUILDING FOUNDATION

Laurence M. Werfel, 12 Avon Lane, East Hills, N.Y., and Harvey A. Berg, P.O. Box 186, Shore Drive, Blooming Grove, N.Y.

Filed Sept. 23, 1970, Ser. No. 74,757
Int. Cl. B28b 7/22
U.S. Cl. 249—13 **1 Claim**



A form unit comprising two spaced apart and opposed downwardly diverging walls interconnected at their top and bottom edges, but unconnected at their end edges so that the unit is open-ended and a plurality of such form units may be arranged end-to-end to produce a form of any desired length.

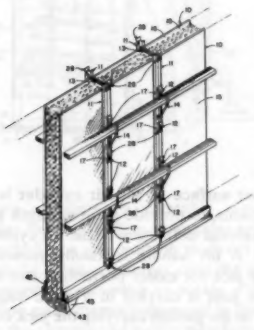
The unit has a relatively wide footing-producing lower region, and each wall has a strengthening rib which may continue into a handle serving as the top connection between the walls. The bottom connection is removable, so that it remains in the hardened concrete when the form is lifted off, and may serve to support reinforcing rods.

3,730,476

UNITIZED METAL-STUD CONCRETE FORM STRUCTURE

Harry A. Prichard, Jr., 29621 20th Avenue South, Federalway, Wash.

Filed March 1, 1971, Ser. No. 119,530
Int. Cl. E04g 9/00
U.S. Cl. 249—191 **4 Claims**



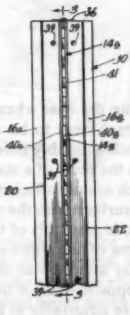
A unitized, reuseable form for generally vertical planar concrete surfaces of some areal extent including plural form panels and metallic supporting studs having particular associated fastening devices. The particularly configured studs are provided with spaced holes to accept ordinary headed snap ties of commerce which are releasably maintained by fastening wedges communicating between snap tie and stud. A particular spreader structure for the form top provides a snap tie with depending U-shaped body to provide great rigidity in the assembled form. Particular waler brackets are supported in the stud holes.

3,730,477

BRACKET SUPPORT UNIT FOR INTEGRAL WALL CONSTRUCTION

John R. Wavrunck, Arlington Heights, Ill., assignor to Capitol Hardware Manufacturing Company, Inc., Chicago, Ill.

Filed Nov. 1, 1971, Ser. No. 194,360
Int. Cl. A47g 29/02; A47f 5/08
U.S. Cl. 248—243 **7 Claims**



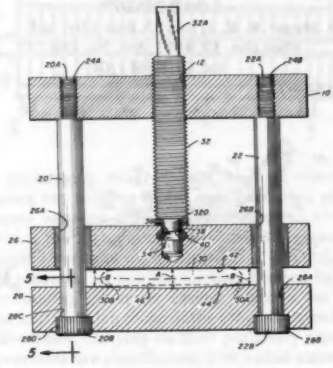
A bracket support unit to be mounted at any one of a number of selected elevations between a pair of closely spaced apart vertical wall-forming support studs and fastened thereto by laterally directed power driven fasteners. The bracket support unit preferably includes a heavy gauge elongated extruded member of aluminum or the like which forms a housing and snugly fits between the closely spaced apart support studs. Laterally extending oppositely directed stop flanges are formed at the forward end of the extruded member to overlie the forward ends of the studs. The extruded housing has a narrow channel therein which receives an elongated slotted bar made of steel or the like, the slots of which are adapted to receive the teeth of a bracket at any one of a number of points therealong. The bar has spaced notches formed along the longitudinal side edges thereof which receive punched or stamped projections formed on the extruded housing to fix the position of the bar in the channel.

3,730,478

TOOL FOR SQUEEZING OFF FLEXIBLE PIPE

Donald J. Burke, and Judson C. Cole, both of Tulsa, Okla., assignors to Continental Industries, Inc., Tulsa, Okla.

Filed Jan. 18, 1971, Ser. No. 107,074
Int. Cl. F16k 7/06
U.S. Cl. 251—8 **4 Claims**



A tool for squeezing off flexible pipe having a clamp with first and second clamp bars adaptable to receive flexible pipe therebetween, the bars having opposed flat pipe contacting surfaces configured such that the distance between the contacting surfaces is greater intermediate the length of the bars than near the ends, and means to force the clamp bars towards each other.

3,730,479

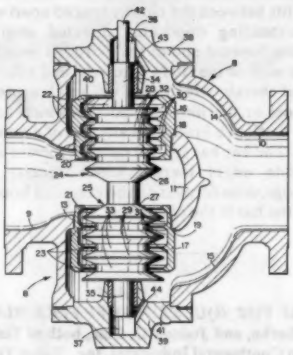
ADJUSTABLE FLUID RESTRICTOR

Hans D. Baumann, Foxboro, Mass., assignor to Masoneilan International, Inc., Norwood, Mass.

Filed July 6, 1971, Ser. No. 159,745
Claims priority, application France, July 6, 1970, 7025031
Int. Cl. F16k 47/00
U.S. Cl. 251—121 **12 Claims**

The present invention constitutes an adjustable fluid restrictor providing throttling means to reduce pressure of liquid or gaseous media through a process of adiabatic flow with friction in contrast to conventional orifice type throttling devices which utilize rapid acceleration and deceleration as primary means of energy conversion. Said adjustable fluid restrictor

containing labyrinth-type restrictions which are adjusted by conventional actuating means and provide constant enthalpy

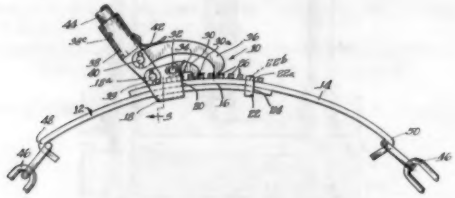


pressure reduction at substantially constant velocity regardless of variations in flow area.

3,730,480
LOAD BINDER

Robert D. Moyer, R. R. 1, Box 33, Star City, Ind.

Filed Oct. 12, 1971, Ser. No. 188,155
Int. Cl. B66f *1/04*
U.S. Cl. 254—71 **4 Claims**



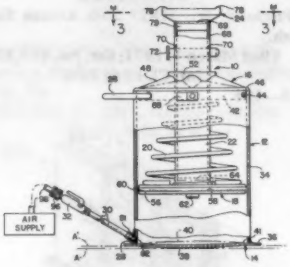
A load binder is formed by a pair of arcuately shaped leaf spring members slidably held together by U-shaped clamps. Teeth are formed on one of the leaf spring members and the other of such leaf spring members includes a holding pawl and loading pawl arrangement connected to the U-shaped clamp thereof. The holding pawl is pivotally secured to the clamp and urged into engagement with the teeth by a spring to prevent separating of the leaf spring members during the tensioning thereof. The holding pawl is then manipulated by a handle, which is removable, to draw together the leaf springs and apply tension through suitable flexible means such as a chain or cable to bind together a plurality of items. Tensioning forces of the load binder are obtained by relative movement of the leaf spring members with respect to one another to shorten their effective length and by the spring tension produced thereby as a result of straightening of these elements.

3,730,481
AIR LIFT JACK

Martin A. Ekonen, 29581 Puritan Avenue, Livonia, Mich., and Stanley Dupras, 15383 West Blue Skies Court, Livonia, Mich.

Filed May 19, 1971, Ser. No. 144,778
Int. Cl. B66f *3/24*
U.S. Cl. 254—93 R **10 Claims**

A lift jack is powered by compressed air and is sealed against the admission of dirt and water into the air cylinder. The air cylinder is provided with a bottom wall or base having a normally convex curvature that becomes concave, in an "oil can" effect, when the jack is placed under load and compressed air applied to the piston within the air cylinder. Convex curvature of the bottom wall allows the relatively heavy lift jack to be moved along on a floor plane more easily and with less effort, and with no damage to the floor surface. An extensible member, adapted to be pin-connected to the main lift cylinder, is also provided to increase the lift height of the

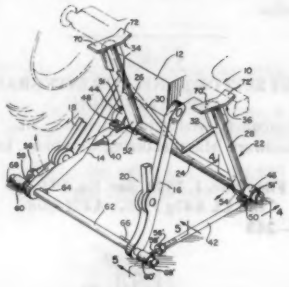


jack. The upper surface of the air cylinder is arranged with radial corrugations, to provide great strength and rigidity and to eliminate material deflection of the lift cylinder in load lifting operation. A lift handle is fixedly secured to the main cylinder of the jack for easier portability and in such attitude that the entire unit is carried in a more balanced manner, without injury to the person carrying the jack or damage to the jack.

3,730,482
TRACTOR JACK

Raymond E. Park, McLean, Ill., and Thomas A. Escoubas, P. O. Box 77, Armington, Ill.

Filed Dec. 9, 1969, Ser. No. 883,391
Int. Cl. B66f *3/00*
U.S. Cl. 254—124 **6 Claims**



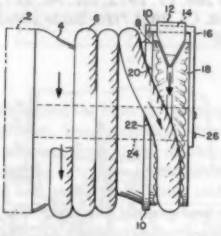
A device for jacking the rear wheel assemblies of a tractor in the form of an attachment to be operated by the conventional three-point hitch assembly mounted on the tractor. The jack attachment is in the form of a stand, comprising interconnected uprights which are of sufficient length to raise the tractor from the ground surface with the upper end of the uprights supporting the rear axle assembly of the tractor. A shaft is carried by the hitch arms of the three-point hitch assembly and lift arms are pivotally attached at their forward ends to the stand and receive opposite ends of the shaft at their rearward ends. The lift arms are adjustable in length and may be swung into and out of engagement with the shaft so that the proper length of the lift arms may be achieved to accomodate for the jacking action.

3,730,483

ASSEMBLY FOR PULLING A LINE

E. Strohm Newell, San Diego, Calif., assignor to Milprint, Inc., Milwaukee, Wis.

Continuation of Ser. No. 105,161, Jan. 11, 1971, abandoned.
This application July 15, 1971, Ser. No. 165,763
Int. Cl. B66d 1/30
U.S. Cl. 254—150 9 Claims



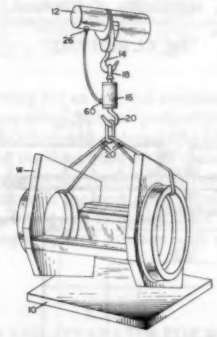
The assembly comprises a rotatably mounted capstan member, a pulley member having an annular groove and a line guide means including a gate portion to direct the movement of the line from the capstan member onto the pulley member. The pulley member is mounted to rotate with the capstan member. The line guide means is disposed in fixed relationship with respect to the capstan and pulley members. The assembly of this invention may be used in combination with a power source to form a line pulling device.

3,730,484

DEVICE FOR PRECISION POSITIONING OF OBJECTS

Roslyn H. Fairbanks, Holden, Mass., assignor to Inter Continental Corporation, West Boylston, Mass.

Filed Jan. 11, 1971, Ser. No. 105,489
Int. Cl. B66d 1/00
U.S. Cl. 254—167 4 Claims



A hydraulically operated link for a hoist comprising a cylinder, a piston therein, a piston rod, a load applying tension to the piston rod and to the opposite end of the cylinder, and a remote control the control being easily operated for allowing flow of fluid to move the piston in the cylinder under conditions of stress; a gauge showing the present pressure, and a pressure operated safety shutoff device for the hoist.

3,730,485

ASHLESS ANTI-RUST ADDITIVES

Aart Strang, and Bernard R. Talens, both of Amsterdam, Netherlands, assignors to Shell Oil Company, New York, N.Y.

Filed Aug. 28, 1970, Ser. No. 68,039
Claims priority, application Great Britain, Sept. 10, 1969, 44,633/69
Int. Cl. C10m 1/20, 1/38
U.S. Cl. 252—57 4 Claims

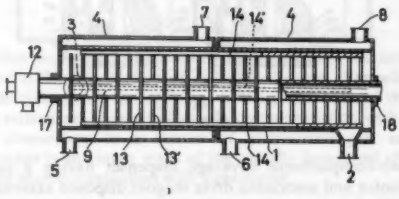
Para hydrocarbyl-substituted phenol or thiophenol dicarboxylic acids as anti-rust and anti-corrosion additives to liquid hydrocarbon fuels and lubricants.

3,730,486

HEAT EXCHANGING MIXER-REACTOR FOR HIGH VISCOSITY SUBSTANCES

Isao Hayashi, and Kenichiro Kondo, both of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Chuyoda-Ku, Tokyo, Japan

Filed April 19, 1971, Ser. No. 135,117
Claims priority, application Japan, April 27, 1970, 35685
Int. Cl. B01f 7/10, 15/06
U.S. Cl. 259—6 4 Claims



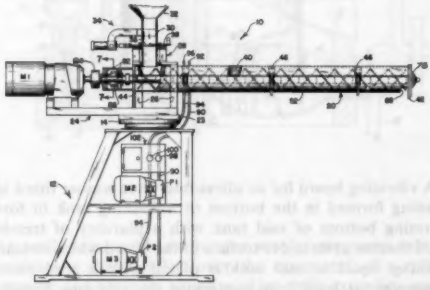
A heat exchanging mixer-reactor for high viscosity substances having two rotating shafts, each carrying a plurality of closely spaced agitating discs, arranged inside an inner casing through which the high viscosity substance is passed via oppositely located inlet and outlet openings; a jacket for the circulation of a heating or cooling medium formed by an outer casing surrounding the inner casing; wherein the agitating discs of one shaft overlap those of the other shaft and rotate in opposite directions, carrying on their periphery wiper fingers whose movements are coordinated with radial cutouts in the discs on the other shaft to avoid interference.

3,730,487

APPARATUS FOR THE CONTINUOUS MIXING OF GRANULAR MATERIALS

Robert S. Lund, Elmhurst, Ill., assignor to Pettibone Corporation, Chicago, Ill.

Filed Aug. 26, 1971, Ser. No. 175,047
Int. Cl. B01f 7/04
U.S. Cl. 259—6 9 Claims



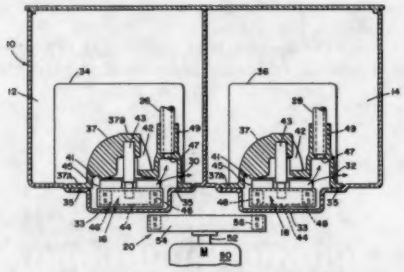
A mixing apparatus adapted for use with granular or semi-solid material and embodying a mixer trough within which are

disposed two parallel companion shafts each of which has mounted thereon a linearly straight row of flat slanting parallel mixing blades, the two rows of blades functioning when the shafts are rotated in opposite directions to propel the material forwardly while at the same time exerting thereon a slicing action whereby progressively diminishing masses of the material are tossed from side to side and are repeatedly sliced into smaller increments as they progress along the trough.

3,730,488
MAGNETIC DRIVE COUPLING FOR BEVERAGE DISPENSER

John A. Gardner, Jr., Tewksbury, Mass., assignor to Jet Spray Cooler, Inc., Waltham, Mass.

Filed May 18, 1972, Ser. No. 254,510
Int. Cl. H02k *7/00*
U.S. Cl. 259—67 **16 Claims**

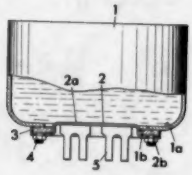


A two-compartment beverage dispenser having a single drive motor and associated drive magnet disposed external of the compartments and a pair of separated driven magnets responsive to rotation of the drive magnet, disposed one in each compartment and each having an impeller associated therewith. The drive magnet is magnetized in one sense, the driven magnets are magnetized in the opposite sense, and the number of pole faces of the drive and driven magnets may be preselected to provide the desired impeller drive speed.

3,730,489
HARD CHROME PLATED VIBRATING BOARD OF AN ULTRASONIC-WAVE WASHER

Katsumi Morita, Higashikatsushika-gun, Japan, assignor to Hakamada Kinzoku Kogyo Kabushiki Kaisha, Edogawa-ku, Tokyo, Japan

Filed March 20, 1972, Ser. No. 236,070
Int. Cl. B01f *11/02*
U.S. Cl. 259—72 **4 Claims**



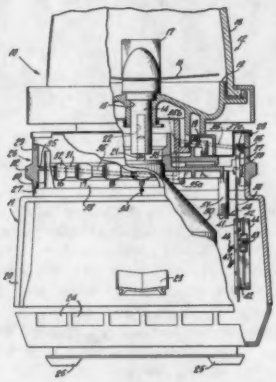
A vibrating board for an ultrasonic-wave washer fitted to an opening formed in the bottom of a washing tank to form a vibrating bottom of said tank with a plurality of tremblers fixed thereto at its under surface of the board which contacts a washing liquid in said tank is plated with a hard chrome. Moreover, at least four corners of the vibrating board are formed thinner than the substantial central area of the board to which the tremblers are attached from the below.

Such construction of the vibrating board can avoid an erosion on the board, eliminated a breakdown of the tremblers and ensure a reliable transmission of an ultrasonic-wave to the liquid, and thus prolongs the durable years of the vibrating board.

3,730,490
MOTOR SPEED CONTROL MECHANISM FOR DOMESTIC BLENDER

Gustave A. Oberg, Wilmington, Del., assignors to Ronson Corporation, Woodbridge, N.J.

Filed Jan. 11, 1972, Ser. No. 217,019
Int. Cl. B01f *7/16*; B02c *18/12*
U.S. Cl. 259—108 **6 Claims**

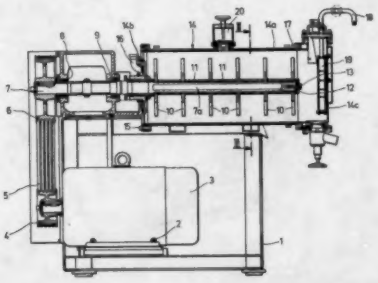


A speed control member which is linked to a ring on a blender such that rotation of the ring on the blender effects a change of speed of the blender motor. Indicia is imprinted on the blender which indicates to the user the speed chosen for a particular location of the ring.

3,730,491
SUSPENSION DISPERSING APPARATUS

Kaspar Kuster, 4000 Basel, Switzerland, assignor to Willy A. Bachofen, Basel, Switzerland

Filed June 7, 1971, Ser. No. 150,696
Claims priority, application Switzerland, June 9, 1970, 8684/70
Int. Cl. B01f *7/02*
U.S. Cl. 259—109 **5 Claims**



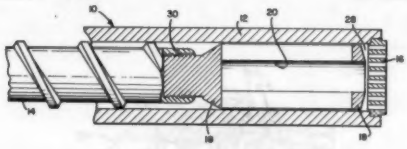
Apparatus for finely dispersing the components of suspensions, having a suspension-receiving container with an end wall incorporating a stuffing box by means of which a shaft is journalled in the end wall for driving an agitator, and an elastic connection between the end wall and the remainder of the container.

3,730,492

MIXING OF THERMOPLASTIC MATERIALS

Bruce H. Maddock, Fanwood, N.J., assignor to Union Carbide Corporation, New York, N.Y.

Filed June 17, 1971, Ser. No. 154,011
Int. Cl. B29f *3/00*
U.S. Cl. 259—193 **4 Claims**



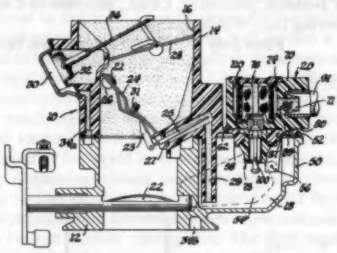
Apparatus is disclosed for heating thermoplastic material to a flowable condition, longitudinally advancing the heated material under pressure toward the discharge end of the apparatus with a rotating extrusion screw having a mixer head at the downstream end thereof; dividing said heated material into a plurality of streams and passing said streams through a plurality of longitudinal mixing passages; passing the plurality of individual streams of the partially fluxed melt through high shear zones between said mixer head and the barrel of said extrusion apparatus; and passing the fluxed melt into the interior of the mixer head and therethrough to the discharge end of said mixer head.

3,730,493

FUEL FITTING

Charles F. Elam, Rochester, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed July 9, 1971, Ser. No. 161,130
Int. Cl. F02m *19/06*
U.S. Cl. 261—4 **4 Claims**



A fuel inlet fitting for an internal combustion engine carburetor has a depending hollow post with exterior lugs for cooperating with interior lugs depending about an inlet opening in the roof of the float bowl of the carburetor to draw and seal the fitting against the roof. A float valve is translatable in an outlet port through the post and is retained therein by an annular lip. The fitting and float bowl roof have detent means to lock the fitting in a fixed position with respect to the float bowl.

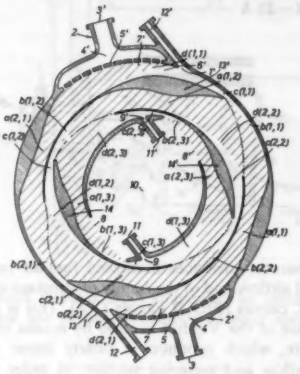
3,730,494

METHOD AND APPARATUS FOR INTIMATELY CONTACTING A GAS AND A LIQUID

Jacques Sterlini, Paris 18° (Seine), France, assignor to Societe Anonyme Compagnie Electro-Mecanique, Paris, France

Filed Aug. 22, 1972, Ser. No. 282,865
Claims priority, application France, Sept. 3, 1971, 7131931
Int. Cl. B01f *3/04*
U.S. Cl. 261—21 **21 Claims**

Apparatus is described for intimately contacting a gas with a liquid comprising a plurality of liquid/gas contacting means formed by walls defining a plurality of channels extending in the same direction about a central axis of the apparatus, each of said channels providing successively a divergent zone in which an opening is provided in the outer wall of the channel, an expansion nozzle, a convergent zone in which an opening is provided in the inner wall of the channel, and an enclosed divergent zone, said channels being interconnected with one another both end to end and by the openings in the inner and outer walls respectively of radially adjacent channels being made coincident, the openings in the outer walls of the radially outermost channels being in communication with means for connection to a source of pressurized gas, and the openings in the inner walls of the radially innermost channels being in communication with a gas outlet.

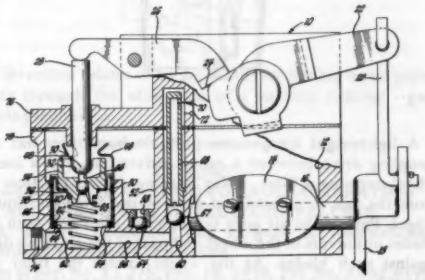


3,730,495

CARBURETOR ACCELERATOR PUMP

Charles F. Elam, Rochester, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed July 15, 1971, Ser. No. 162,928
Int. Cl. F02m *7/08*
U.S. Cl. 261—34 A **2 Claims**



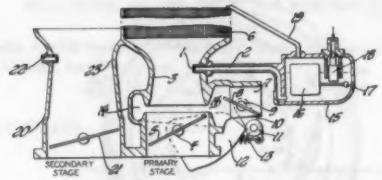
An easily serviceable carburetor accelerator pump unit incorporates a shield rolled over the outer rim of a rolling diaphragm and having a plurality of inwardly extending members to limit upward travel of a plunger head carried by the diaphragm.

3,730,496

CARBURETOR FOR AUTOMOTIVE ENGINES WITH A METERING SUCTION PARTLY DERIVED FROM A LAMINAR AIR FLOW MATRIX

Henri Morgenroth, 3090 Hidden Valley Lane, Santa Barbara, Calif.

Filed July 1, 1968, Ser. No. 741,572
Int. Cl. F02m 7/04
U.S. Cl. 261—23 A **25 Claims**



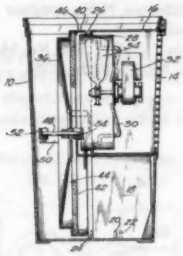
The carburetor produces increased fuel-air ratio towards the reduced airflow end of the family of constant-throttle variable-R.P.M. curves (FIG. 7 curves *i j k*). This is obtained by augmentation of the Venturi suction by means of a Laminar Flow Matrix, which produces a nearly linear relationship between airflow and metering suction. In order to maintain the correct roadload curve despite this low-end increase of the metering signal, a bypass throttle, controlled by the main throttle, resets the fuel-air ratio to the correct value (FIG. 6). The schedule of bypass throttle opening relative to main throttle opening determines the roadload curve.

3,730,497

PORTABLE HUMIDIFIER

Arthur J. Schmitt, and Lloyd H. Spaeth, both of West Bend, Wis., assignors to The West Bend Company, West Bend, Wis.

Filed Feb. 3, 1971, Ser. No. 112,253
Int. Cl. B01f 3/04
U.S. Cl. 261—24 **3 Claims**



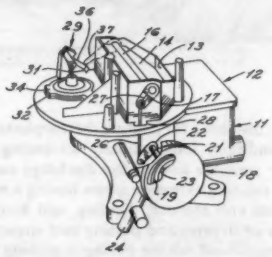
A lightweight inexpensive portable humidifier has an air coupling drive between a motor driven fan and a louvered wheel carrying a filter. A fan housing directs the flow of air from the fan to a restricted area of the filter and louvered wheel. Part of the air goes through the filter and then to the blades or louvers of the wheel and part of the air flows directly against such blades. As the wheel rotates the filter passes through a supply of water in a casing having a water storage reservoir and as the air goes through the filter moisture is evaporated into the air. The fan, fan housing, driving motor, saddle block bearings for the shaft of the wheel and float arm are all mounted on a chassis to form a unit which is self-supporting in the water containing casing and is removable therefrom to operate, without the wheel, externally of such casing. When water falls below a low point the float arm operates a brake to stop the wheel from rotating without stopping the fan.

3,730,498

CONTROL MEANS FOR CARBURETOR AUTOMATIC CHOKE

Timothy R. Keenon, Dearborn Heights, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 28, 1970, Ser. No. 101,568
Int. Cl. F02m 1/10
U.S. Cl. 261—39 B **5 Claims**



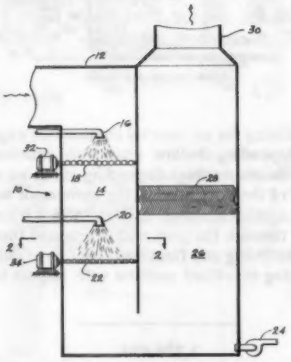
A control means for a carburetor automatic choke in which the bimetal input to the choke plate pivot shaft is varied by a lost motion variable radius connection. The control means includes linkage having a pair of pivot arms interconnected by a link. One end of the link is slidably received in a radially directed slot formed in one of the arms so that lost motion movement of the link within the slot varies the effective radial length of the arm.

3,730,499

DAMPER-ROD SCRUBBER

James Jonakin, Simsbury, Conn., assignor to Combustion Engineering Inc., Windsor, Conn.

Filed July 21, 1971, Ser. No. 164,762
Int. Cl. B01f 3/04
U.S. Cl. 261—109 **4 Claims**



A wet scrubber having spray means for spraying a liquid into a passageway, and a rod scrubber positioned downstream of the spray means by which impurities can be removed from the gas stream. The rods of the scrubber are rotatably mounted, so that they can be rotated to a position parallel to the gas flow when it is desired. The rods are removably attached, so that they can be readily replaced if the need arises.

3,730,500

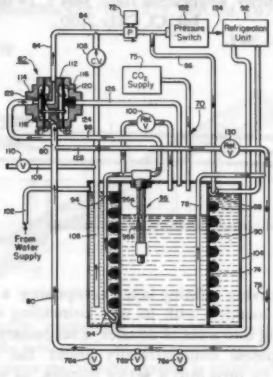
LIQUID LEVEL CONTROL SYSTEM AND CARBONATOR

George B. Richards, Lake Forest, Ill., assignor to Fluid Device Corporation, Highland Park, Ill.

Continuation-in-part of Ser. No. 724,385, April 26, 1968, abandoned. This application June 19, 1969, Ser. No. 840,119

Int. Cl. B01f *3/04*; B67d *5/62*

U.S. Cl. 261—140 38 Claims



A flow regulator is disclosed for controlling liquid flow, for example, from a supply source to a receiving tank according to the liquid level in the tank. Specifically, a fluid interaction device communicating with the receiving tank causes a fluid pressure signal to be developed in response to departure of the liquid in the tank from a predetermined level. A differential pressure responsive valve adjusts liquid flow from the supply source to the receiving tank in response to the fluid pressure signal. Several embodiments and other features including a digital fluid amplifier for liquid level sensing are disclosed.

A beverage dispensing system incorporating the aforesaid flow regulator is also disclosed. A cold carbonated liquid is continually circulated past dispensers from a pressurized chill tank having a carbon dioxide atmosphere. The flow regulator admits further liquid to the system from a supply source whenever liquid is tapped from the system by the dispensers. Other features including pressure sensing for temperature control are disclosed.

3,730,501

APPARATUS FOR TREATMENT OF METAL PRODUCTS

Andre Gueussier; Roland Tricot, and Michel Lacoude, all of 73 Albertville, France, assignors to Ugine Aciers, Paris, France

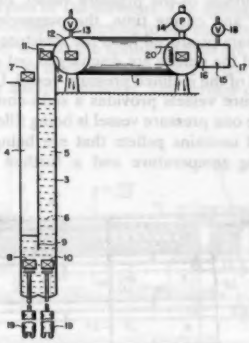
Continuation-in-part of Ser. No. 748,291, July 29, 1968, abandoned. This application Dec. 16, 1970, Ser. No. 98,673

Claims priority, application France, Aug. 1, 1967, 67116523

Int. Cl. C21d *1/62*

U.S. Cl. 266—4 A 5 Claims

Apparatus for heat treating and descaling metal without harmful superficial decarburization of the shapes. The apparatus comprises a furnace chamber wherein reducing atmospheres, temperatures between 700° and 1,200° C and vacuums between 100 and 0.01 torr may be maintained. A barometric lock enables steel shapes to be introduced and removed from the furnace chamber without disturbing the vacuum.



3,730,502

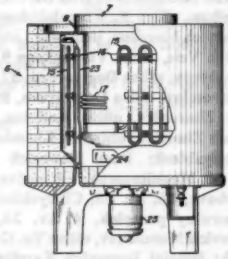
APPARATUS FOR VACUUM BRAZING-GAS QUENCHING NON-FERROUS AND FERROUS ALLOYS

Paul K. Shutt, Jr., Aberdeen; Francis B. Gertner, Baltimore, and Frank T. Kirk, Forest Hill, all of Md., assignors to The United States of America as represented by the Secretary of the Army

Division of Ser. No. 816,697, April 16, 1969, Pat. No. 3,608,187. This application May 21, 1971, Ser. No. 145,661

Int. Cl. C21d *1/00*

U.S. Cl. 266—5 R 5 Claims



The invention relates to an apparatus for joining metal parts together through the utilization of a vacuum brazing - gas quenching technique.

3,730,503

APPARATUS AND METHOD FOR AGGLOMERATING AND HARDENING METAL OXIDE PELLETS

Carl A. Holley, Glenshaw, Pa., assignor to International Minerals & Chemical Corporation

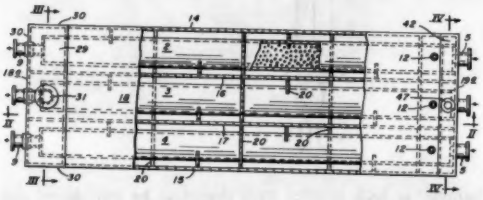
Division of Ser. No. 12,275, Feb. 18, 1970, Pat. No. 3,682,619. This application Dec. 15, 1971, Ser. No. 208,496

Int. Cl. F27b *21/00*

U.S. Cl. 266—20 7 Claims

An apparatus and process are provided for agglomerating and hardening moist green pellets of a metal oxide containing a cementitious binder, the hardened pellets being formed by a semi-continuous process using heat and pressure to cure the pellets. Moist green pellets containing a cementitious binder are introduced into the upper portion of a preheated inclined pressure vessel, the pellets rolling down the bottom wall of the

inclined pressure vessel and the pellet surface dried. The vessel, after filling, is sealed to the atmosphere and the pellets are heated to the desired curing temperature by passing hot gases around the outside of the pressure vessel. Following a sufficient heating and curing time, the pressurized atmosphere, containing steam produced from the moisture in the pellets, is exhausted and the pellets are discharged out of an opening in the lower end of the inclined pressure vessel. Use of a plurality of such pressure vessels provides a semi-continuous process wherein while one pressure vessel is being filled with pellets, a second vessel contains pellets that are being heated to the desired curing temperature and a further pressure vessel



which contains pellets that have been heated to the desired temperature is held at the curing temperature to harden the pellets therein. The pressure vessels are contained within heating jackets which are interconnected to a manifold system for circulating hot gases first through the jacket of the vessel which contains the pellets that are to be heated, then through the jacket of the vessel which contains the pellets which are being held at curing temperature, and then, while a portion of the spent gases are recycled, the remainder is fed to the jacket which surrounds the pressure vessel that is being filled with pellets, preheating the vessel and the pellets prior to being exhausted to the atmosphere.

3,730,504

WORKPIECE SCARFING DEVICE

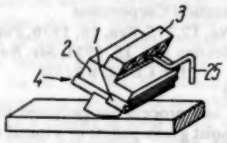
Artur Lvovich Dalker, ulitsa B. Khmelnitskogo, 27, kv. 14; Alexandr Nikolaevich Morozov, prospekt Lenina, 74, kv. 25; Anatoly Ivanovich Veis, ulitsa Vorovskogo 9, kv. 77; Boris Grigorievich Kushtuev, ulitsa Degtyareva, 37, kv. 8; Nikolai Mikhailovich Novoselov, ulitsa Degtyareva, 89, kv. 58; Viktor Nikolaevich Zhuravlev, ulitsa Kalinina, 19, kv. 107; Alexei Fedorovich Zinoviev, ulitsa B. Khemlnitskogo, 9, kv. 85, all of Chelyabinsk; Ivan Ivanovich Alfeev, ulitsa Kalinina, 3, kv. 66, Magnitogorsk; Viktor Ivanovich Nikitin, ulitsa P. Kalmykova, 16, kv. 58, Chelyabinsk; Alexei Ilich Kochergin, Teatralny pereulok, 4, kv. 24, Chelyabinsk; Vladimir Filippovich Matashkov, ulitsa Ya. Gasheka, 18, kv. 13, Chelyabinsk; Nikolai Ivanovich Karelin, ulitsa Lipetskaya, 23, kv. 16, Chelyabinsk; Jury Venediktovich Volchematiev, ulitsa I Sputnika, 27, kv. 55, Chelyabinsk; Veniamin Fedorovich Zaluzhentsev, ulitsa Degtyareva, 37, kv. 6, Chelyabinsk, and Gennady Yakovlevich Morozov, ulitsa Kommunisticheskaya, 6a, kv. 67, Chelyabinsk, all of U.S.S.R.

Filed Nov. 3, 1971, Ser. No. 195,195

Claims priority, application U.S.S.R., Aug. 21, 1968, 1265222

Int. Cl. B23k 7/06

U.S. Cl. 266—23 H **3 Claims**



A device made up of a set of blocks. Each block comprises a gas-cutting unit with an upper portion against which butts a gas-distributing unit, incorporating an oxygen and combustible gas chambers fitted with cut-off diaphragm valves.

Mounted on a cover of the gas-distributing unit is a gas-regulating unit intended for actuating each valve individually.

3,730,505

DOUBLE DELIVERY LANCE FOR REFINING THE STEEL IN THE CONVERTER PROCESSES

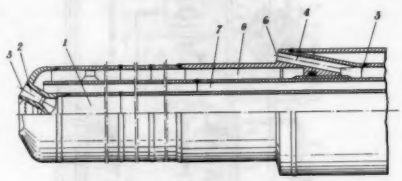
Aldo Ramacciotti, Rome; Alberto Praitoni, and Bruno Imberti, both of Genova, all of Italy, assignors to Centro Sperimentale Metallurgico S.p.A., Rome, Italy

Filed June 1, 1971, Ser. No. 148,520

Claims priority, application Italy, July 1, 1970, 51838 A/70

Int. Cl. C21c 7/00

U.S. Cl. 266—34 L **7 Claims**



Double-delivery refining lance comprising: a main conduit, in a central location with its axis coinciding with the lance axis, diverging into a set of nozzles; a secondary outer annular conduit disposed concentrically about the main conduit diverging in its turn into a set of nozzles, as well as annular conduits, disposed concentrically about the above mentioned main and secondary conduits for cooling fluid input and output respectively. The discharging nozzles of the main conduit diverge conically with respect to the lance axis downwardly by an acute angle and are arranged symmetrically; also the discharging nozzles of the secondary circuit are downwardly inclined with respect to the lance axis by an acute angle not necessarily coinciding with the former and symmetrically arranged; the inclination of the discharging nozzles of the main conduit and respectively of the secondary conduit, and their respective locations, longitudinally and radially with respect to the lance axis, are such as to make the lance particularly useful in converters rotating around a vertical axis.

3,730,506

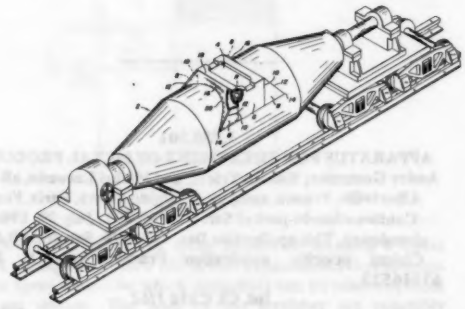
MIXER LADLE STRUCTURE

Richard J. McAfee, Forest Hills Borough, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Dec. 20, 1971, Ser. No. 210,000

Int. Cl. F27d 15/00

U.S. Cl. 266—39 **1 Claim**



Improved structure includes a substantially rectangular spout box made of refractory lined plates having extended side

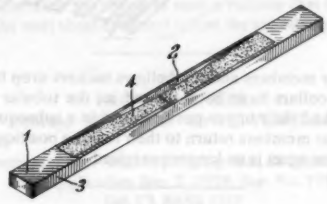
plates at each end extending longitudinally of the ladle body from opposite sides of the spout box, and gusset plates connected with and extending between the side plates transversely of the ladle body on opposite sides of the spout box.

3,730,507

BORON NITRIDE BASE EVAPORATION VESSEL HAVING A SURFACE COATING OF TITANIUM-SILICON THEREON

Lionel C. Montgomery, North Olmsted, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Continuation of Ser. No. 742,446, July 3, 1968, abandoned.
This application Jan. 18, 1971, Ser. No. 107,542
Int. Cl. C23c *13/12*
U.S. Cl. 266—39 **10 Claims**



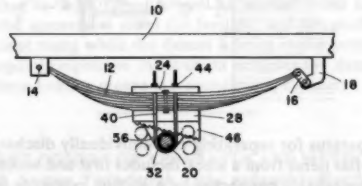
A boron nitride containing evaporation vessel which is readily wetted by molten metals and accordingly ideally suited for use in a vacuum metallizing system is provided by coating at least a portion of the evaporation surface of the vessel with a titanium-silicon base alloy.

3,730,508

VARIABLE OFFSET SPRING MOUNTING BLOCK FOR LOAD-BEARING VEHICLES

Daniel Marian, 3924 Cascade Drive, Youngstown, Ohio, and Michael Ramun, 53 Broadway St., Youngstown, Ohio

Filed March 19, 1971, Ser. No. 126,120
Int. Cl. F16f *1/22*
U.S. Cl. 267—52 **3 Claims**



A suspension arrangement in which the axis may be shifted fore or aft of the center of the spring assembly. A carrier member is mounted on the spring assembly. The carrier member mates with an axle mounting block secured to the axle. The mating surfaces of the carrier and the axle mounting members are keyed so that the axle mounting member may be shifted forward or aft to any one of several descrete positions on the carrier member.

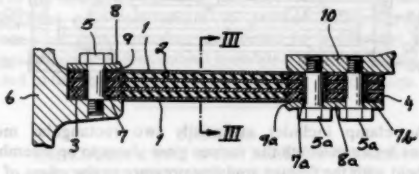
3,730,509

COMPOSITE SPRING ELEMENT FOR USE AS A MOTOR MOUNT

Raoul Jorn, Post Wasserburg a.B., Hengnau, Germany

Filed April 12, 1971, Ser. No. 132,981
Int. Cl. F16f *3/10*
U.S. Cl. 267—152 **14 Claims**

A spring element includes a plurality of flat leaf springs which are parallel to each other and have a supported side and a deflectable load-engaging side, and a body of elastomeric material between the springs and bonded to at least one of them while being at least engageable with the other spring after some deflection of the element. The spring element can be elongated and bolted at one end to the load and at the other end to the support so that the springs, which are of some very rigid material such as steel, serve to support the load and the elastomeric body damps vibration. The springs can be bolted



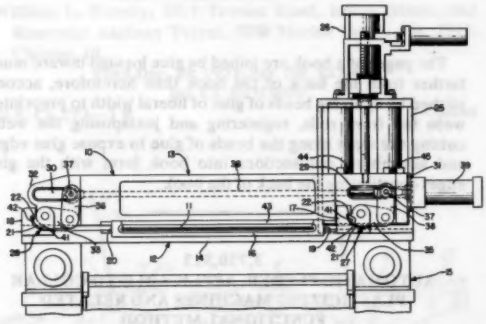
at one end and can also be of differing lengths, with the longest spring formed at its free end with an eye adapted to receive a bolt or pin on a load. The springs can also be annular with a plurality of inwardly extending tabs bent away from the plane of the outer periphery. The elastomeric body is a soft rubber or rubber mixture capable of withstanding heat and resistant to destruction by oil. Use of these elements for supporting an internal-combustion engine on a motor-vehicle frame is envisaged.

3,730,510

LOCKING DEVICE FOR THE CLAMPS OF A TUBE SPLICER

Max D. Brinkley, North Canton, and Glenn D. Kerr, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Nov. 29, 1971, Ser. No. 202,907
Int. Cl. B23g *3/06*
U.S. Cl. 269—25 **15 Claims**



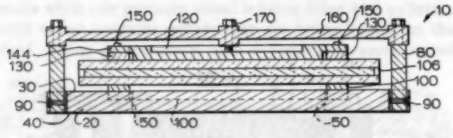
A machine having a pair of clamps for holding opposing ends of an innertube firmly in position for cutting and subsequent movement into compressive, splicing engagement. Each clamp has a movable jaw cantilevered over a fixed jaw and a latching mechanism for locking the jaws together to eliminate any movement of the clamps, especially the free cantilevered ends of the movable jaws.

3,730,511

CLAMP FOR USE IN ASSEMBLING DISPLAY DEVICE

Bernard Caras, Princeton, N.J., assignor to Burroughs Corporation, Detroit, Mich.

Filed March 12, 1971, Ser. No. 123,593
Int. Cl. B32b *31/20*; B25b *5/10*
U.S. Cl. 269—152 9 Claims



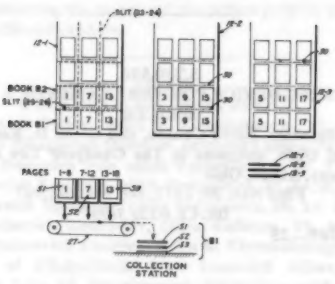
The clamp includes essentially two rectangular metal frames between which the various glass plates to be assembled are held with the frames applying pressure to the edges of the plates. The metal plates are pressed against the glass plates with resilient members which provide a spring-like effect.

3,730,512

METHOD AND APPARATUS FOR MAKING BOOKS

Joseph V. Bellanca, Tallahassee, Fla., assignor to McCain Manufacturing Corp., Chicago, Ill.

Continuation-in-part of Ser. No. 856,676, Sept. 10, 1969, abandoned. This application July 26, 1971, Ser. No. 165,484
Int. Cl. B42c *19/00*; B42b *1/02*
U.S. Cl. 11—1 R 14 Claims



The pages of a book are joined by glue located inward much farther from the back of the book than heretofore, accomplished by applying beads of glue of liberal width to preprinted webs fed from rolls, registering and juxtaposing the webs, cutting the webs along the beads of glue to expose glue edges and assembling cut sections into book form with the glue edges constituting the back of the book.

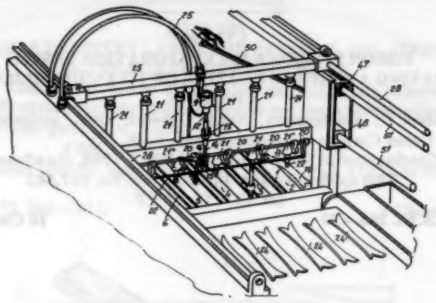
3,730,513

AUTOMATIC FEEDER, APPLICABLE TO COLLAR PLASTICIZING MACHINES AND RELATED FUNCTIONAL METHOD

Serafino Colombini, 38 Via Matteotti, Pero, Italy

Filed Aug. 3, 1970, Ser. No. 60,471
Claims priority, application Italy, Aug. 2, 1969, 20506 A/69
Int. Cl. B65h *3/00*, *5/10*
U.S. Cl. 271—9 6 Claims

A new automatic feeder for collar plasticizing machines, includes a loader, subdivided into a plurality of compartments where the collars are piled, a movable frame capable of alternating rectilinear motion along side slides and supporting pneumatic cylinders which are provided at the lower end with bellows suckers for sucking in the collars onto the conveyor belt into the plasticizing machine. An electromagnet imparts an alternating oscillatory motion to lamellar members which act as locking members for the tubular members and causes the lamellar members to release the tubular members so that



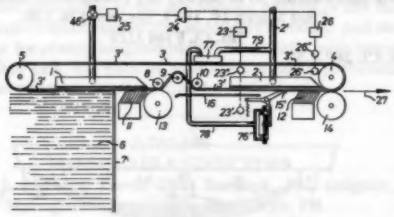
the tubular members and the bellows suckers drop by gravity. After the collars have been sucked in, the tubular members have reached their upper position, and in a subsequent stage, the lamellar members return to their locking position, because the electromagnet is no longer energized.

3,730,514

APPARATUS FOR THE SEPARATE DISCHARGE OF FLAT ITEMS FROM A STACK

Gisbert Burkhardt, Reichenau-Mittelzell, Germany, assignor to TELEFUNKEN Patentverwertungsgesellschaft mbH, Ulm/Danube, Germany

Filed Dec. 15, 1971, Ser. No. 208,312
Claims priority, application Germany, Dec. 24, 1970, P 20 63 874.8; Dec. 24, 1970, P 70 47 771.3
Int. Cl. B65h *3/12*, *3/46*
U.S. Cl. 271—11 5 Claims



Apparatus for separating and individually discharging relatively flat items from a stack includes first and second separators operatively connected by a suction conveyor belt with a plurality of groups of suction openings. In the area of the second separator an abutment member is positioned to be movable to temporarily block the conveying path before each arrival of an item from the first separator. The movement of the abutment member is effected through a pneumatic setting device that can be selectively connected with a source of subatmospheric pressure by a valve associated with the groups of suction openings in suction conveyor belt.

3,730,515

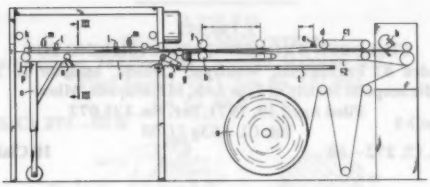
APPARATUS FOR FEEDING SHEETS OF PAPER

Helmit Spiess, Haydnstrasse 17a, 8906 Gersthoffen, Germany

Filed Feb. 11, 1971, Ser. No. 114,623
Claims priority, application Germany, March 5, 1970, P 20 10 467.0
Int. Cl. B65h *5/24*
U.S. Cl. 271—46 1 Claim

Apparatus for feeding sheets cut from a continuous web of paper in an underlapping sequence or array comprising a

group of suction cups, suction rollers or the like, which are adapted to be moved back and forth parallel to the line of travel of the sheets and attach themselves to the trailing edges

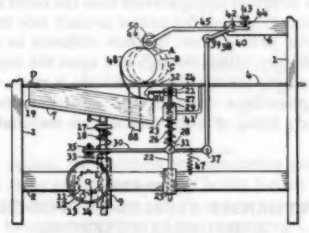


of successive sheets after they are freed from conveying means to lift the edges of these sheets, retard their forward movement, and stretch the sheets in such a manner that the leading edge of the next sheet is moved below the raised edge.

3,730,516
PACK ADVANCER

Maurice Debray, 90 Laurier Street, Valleyfield, Quebec, Canada

Continuation of Ser. No. 541,941, April 8, 1966, abandoned. This application Jan. 5, 1970, Ser. No. 779
Int. Cl. B65h *1/12*
U.S. Cl. 271—62 R **5 Claims**

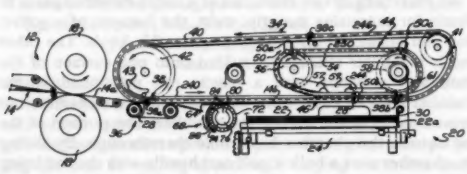


A vertically movable platform supports a pack of sheets and is urged upwardly to bring the uppermost sheet against a detent which is normally held at a fixed level above the platform. The detent is then raised above its normal fixed level to release the uppermost sheet for feeding, and the platform is held against rising while the detent is in its raised position. A sheet demand responsive mechanism actuates the detent and the platform holding means in a coordinated manner.

3,730,517
SHEET CONVEYOR APPARATUS AND METHOD

Robert K. Norton, Twinsburgh, Ohio, assignor to Harris-Intertype Corporation, Cleveland, Ohio

Continuation of Ser. No. 792,693, Jan. 21, 1969, abandoned. This application May 3, 1971, Ser. No. 139,917
Int. Cl. B65h *29/04*
U.S. Cl. 271—76 **37 Claims**

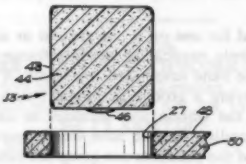


An improved sheet slowdown method and apparatus includes gripping a leading end portion of a sheet with clamp assemblies of a main conveyor and transporting the sheet along a horizontal path to a transfer station which is located directly above a pile of sheets. At the transfer station, the leading end portion of the sheet is engaged by clamp assemblies of a slowdown conveyor which is operating at the same speed as the main conveyor. The clamp assemblies of the main conveyor are then released and the speed of operation of the slowdown conveyor is reduced to decelerate the sheet before it is released at a receiving station where the leading end portion of the sheet engages a stop member to position the sheet relative to the pile of sheets. This reduction in the speed of operation of the slowdown conveyor may be provided by actuating a differential gear mechanism to provide relative rotation between an input member connected to a constant speed source of power and an output member which is drivingly connected to the slowdown conveyor.

3,730,518
CHILDREN'S TOY WITH RESILIENT BALL SUPPORTING RESILIENT OBSTACLES

Joseph E. Drapcho, Minneapolis, Minn., assignor to The Minneapolis Society of Fine Arts, Minneapolis, Minn.

Filed April 8, 1971, Ser. No. 132,447
Int. Cl. A63g *31/00*
U.S. Cl. 272—1 R **10 Claims**

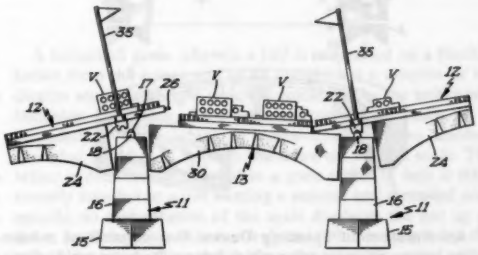


A children's amusement toy of a resilient base member removably supporting several resilient upstanding members is disclosed. The base member is of a length and width sufficient to permit several children to sumultaneously run and play thereon. The upstanding members, certain of which are at least twenty-four inches high, are mounted in supportive depressions in the base to provide spaced resilient obstacles and play toys for the amusement of children.

3,730,519
COLLAPSIBLE BRIDGE GAME

William L. Garrity, 4717 Townes Road, Edina, Minn., and Rimvydas Anthony Tveras, 5030 Marine Drive, Apt. 2712, Chicago, Ill.

Filed Dec. 29, 1971, Ser. No. 213,499
Int. Cl. A63f *9/00*
U.S. Cl. 273—1 R **7 Claims**



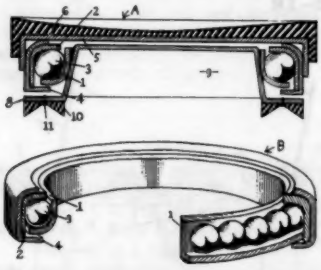
Game apparatus in the form of a collapsible bridge. Two end-span deck sections are supported on spaced piers and a mid-span deck section is supported between the end-span

deck sections to form a continuous bridge deck over the piers. Under dead load conditions and with live loading on the main portion of the end-span deck sections, the bridge is stable. As live load accumulates on the mid-span deck section, the bridge collapses.

3,730,520
PLAYGROUND TOY
Douglas P. Willis, 1201 East Market Street, Aberdeen, Wash.
Filed May 1, 1972, Ser. No. 248,888
Int. Cl. A63g *21/00*
U.S. Cl. 272—1 R **7 Claims**

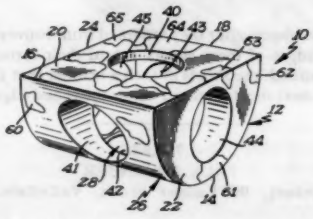
A toy adapted for use on a playground or similar area including a relatively vertical upstanding framework having a spiral ribbon-like band suspended therefrom. A child supporting platform having a groove to interact with the ribbon is threaded upon the ribbon and includes as an integral part thereof an upstanding flexible tube which surrounds the ribbon. The rider of the platform can grasp the tube for stabilization and use it as a braking means by simply squeezing the tube about the ribbon-like band. For playground use a shock absorbing resilient means may be located at the bottom of the ribbon to halt the descent. In one embodiment, the band may be positioned over the corner of a swimming pool. In another embodiment, a ladder is provided so that the child may climb to the top of the framework.

3,730,521
AMUSEMENT SPINNING DEVICE
Donald L. Sellman, Box 127, Stanley, Kans.
Continuation-in-part of Ser. No. 743,091, July 8, 1968, abandoned. This application Feb. 4, 1971, Ser. No. 112,592
Int. Cl. A63b *23/04*
U.S. Cl. 272—57 A **2 Claims**



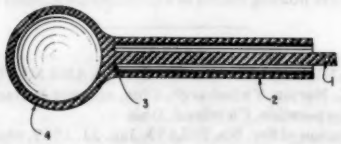
An Amusement Spinning Device that consists of a base plate having an outer edge which has on the bottom side three or more anti-slip supporting lugs and a cup shaped shoulder near the outer edge and on the top side of said base plate that supports an annular type axial thrust ball bearing assembly at the outer boundary of the device. Also there is an inverted cup shaped top plate that is tightly fitted over the ball bearing assembly annular band and covers the top side of the ball bearing assembly and forms a support for an anti-slip top cap. This device is very small in size and for one foot operation.

3,730,522
CHILDREN'S ROCKING AND CLIMBING TOY
Sandra K. Paczkowski, Montreal, Canada, assignor to The Minneapolis Society of Fine Arts, Minneapolis, Minn.
Filed April 19, 1971, Ser. No. 135,072
Int. Cl. A63g *31/00*
U.S. Cl. 272—60 **10 Claims**



A children's amusement toy of a curved outer surface intersecting two parallel sides and a flat surface to form a solid body is disclosed. The body has a hollow center formed therein of a different configuration than the outer surface with a tunnel extending from the center to each side in a mutually perpendicular arrangement to allow children to rock within and upon the toy, climb through and upon the toy, and climb through and over the toy. The solid body is made to present a pleasing appearance through use of transparent surface material and a filling of multicolored foam material.

3,730,523
GOLF CART HANDLE ATTACHMENT FOR GRIP, WRIST AND FOREARM EXERCISE
Allen A. McRae, 18110 Shawnee Trail, Tualatin, Oreg.
Filed Aug. 20, 1971, Ser. No. 173,370
Int. Cl. A63b *23/00*, *21/30*
U.S. Cl. 272—67 **1 Claim**

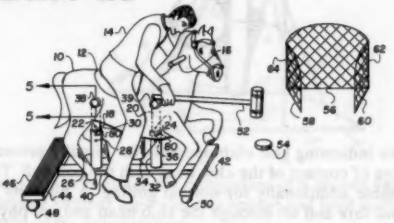


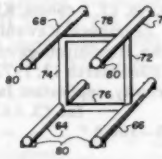
An exercising device made out of a single moulded piece of plastic for exercising the grip, wrist, the forearm of a golfer. One end of the device is a soft, squeezable knob. The other end is a tubular chamber moulded onto one surface of the knob and provided with a plastic rod positioned in the chamber and extending from the knob end of the chamber out beyond the opposite end of the chamber. The portion of the rod outside the chamber has a hole therethrough. By sliding the chamber over a hollow golf cart handle with the rod being positioned inside the handle and fixedly bolting the portion of the rod with the hole therethrough to the handle, one may obtain exercise by twisting the knob and chamber against the resistance to twisting of the rod and by squeezing the knob.

ERRATUM

For Class 273—1 R see:
Patent No. 3,730,519

3,730,524
MULTI-GAME SYSTEM
Martin Green, 243 Franklin Turnpike, Mahwah, N.J.
Filed April 7, 1971, Ser. No. 131,983
Int. Cl. A63f 7/06
U.S. Cl. 273—85 R **5 Claims**

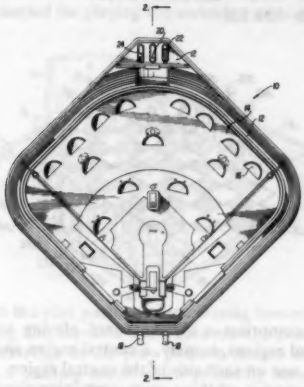




A game system for children for simulating polo, hockey, soccer and other games by means of hobby horses and auxiliary devices. Stability of the hobby horse structure is obtained by a wide base construction of the supporting frame. Additional safety factors are incorporated into the game system by having the hooves of the hobby horse turned inwardly; elimination of sharp edges; utilization of light-weight construction material; and supporting T-sections within the horse for structural strength. Maneuverability of the hobby horse is achieved by means of swivelable casters and by means of greater leg room for the game participants. The height of the hobby horses are adjustable by means of telescopic support posts. The game system also provides for vertical and horizontal stacking of the hobby horses for storage in a small area. A pair of hollow posts extend laterally through front and rear sections of the hobby horse body and engage the supporting T-sections. A stacking rack comprising horizontal posts attached to a frame is provided. The horizontal posts fit into the hollow posts to support the hobby horses.

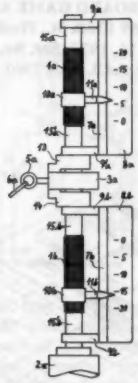
3,730,525
BASEBALL GAME WITH BALL DEFLECTING PITCHER MECHANISM
Taketora Maeda, Setagaya-ku, Tokyo, Japan, assignor to Epoch Company, Ltd., Tokyo, Japan
Filed Nov. 5, 1971, Ser. No. 196,102
Int. Cl. A63f 7/06
U.S. Cl. 273—89 **2 Claims**

A baseball amusement device featuring a bat rotatable by one player either from the right or left hand positions and a pitching mechanism operable by the other player for projecting the ball at varying speed with varying curvature and to drop below the swinging bat, if desired. The pitching mechanism is provided with a rotatable magnet which causes the ball to deviate from a straight line path after it is projected such that the direction of travel of the ball may be controlled permitting straight and curved balls. A trapdoor, mounted within the playing surface immediately preceding the bat,



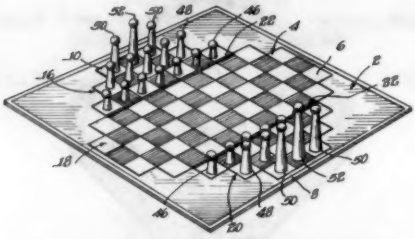
makes it possible for the pitcher to simulate a sinking pitch by causing the ball to pass below the plane of the swinging bat.

3,730,526
TETHERBALL GAME WITH SCORE COUNTER
Franz Litzka, 859 Marktredwitz, Germany
Filed March 16, 1970, Ser. No. 19,847
Int. Cl. A63f 71/02
U.S. Cl. 273—95 A **4 Claims**



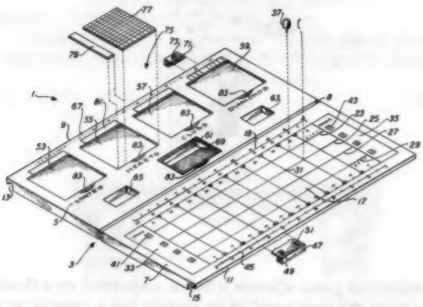
A tetherball game wherein a ball is suspended on a flexible tether from the upper end of an upright has a counter or indicator atop the upright which is connected to the tether and indicates the score. This counter consists basically of a threaded member which is screwed relative to another threaded member to indicate the score on a linear scale. The tether is rotationally coupled to a scale which in turn is rotationally coupled to a nut bearing a pointer and threaded on a spindle, so that rotation of the scale displaces the nut up or down on the spindle. Alternatively the tether is coupled to the spindle to rotate this relative to a nonrotatable scale, with a nonrotatable nut again serving as pointer. Two scales are preferably provided, each connected through a unidirectional clutch to the tether so that each indicates the points made by one player.

3,730,527
BOARD GAME APPARATUS
Charles R. Nelson, 6925 Oak Lawn Court, Oak Lawn, Ill.
Filed April 12, 1971, Ser. No. 133,222
Int. Cl. A63f 3/00
U.S. Cl. 273—131 KN **1 Claim**



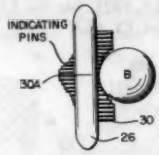
A game comprises a checkerboard playing surface with three defined regions, namely, a central region and two starting regions, one on each side of the central region. Each starting region consists of three rows containing three, five and seven playing squares, respectively, the rows increasing in length inwardly of the board. The central region consists of five rows, the three central rows having eleven squares and each outer row having nine squares. Groups of objects, one for each player, are disposed in their respective starting regions completely filling the squares thereof. The objects include identifiable sub-groups and a unique object, all of which may be moved across the playing surface in prescribed ways according to the rules of the game and for the purpose of moving the unique object from its starting region to the starting region of the opponent.

3,730,528
FOOTBALL BOARD GAME APPARATUS
Henry R. Corrado, 56-69 136th St., Flushing, N.Y.
Filed Feb. 16, 1971, Ser. No. 115,321
Int. Cl. A63f 3/00
U.S. Cl. 273—134 AD **8 Claims**



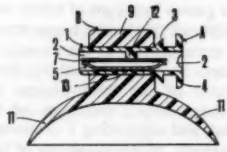
A simulated football game centered upon a game board provided with a simulated playing field, a recessed well for receiving and storing ordinary playing cards therein, and a series of four, changeable play selection matrices for correlating the numerical and suit values of chance picked playing cards with selected football plays to thereby yield the result of the selected play in yards gained, lost, or so forth. The matrices are formed by a series of four recesses in the board. A single play selection line bounds the recesses, and different separately changeable play result-carrying sub-matrices and card value-carrying column elements are insertable into the recesses.

3,730,529
STROKE INDICATING GOLF CLUB
Donald E. Donofrio, 304 N. York Road, Willow Grove, Pa.
Filed Dec. 10, 1971, Ser. No. 206,649
Int. Cl. A63b 69/36
U.S. Cl. 273—186 A **6 Claims**



A stroke indicating golf club operable for visually presenting the area of contact of the club head with the golf ball. The club is usable additionally for normal golfing. A plurality of pins extend fore and aft through the club head and are physically displaceable by ball contact to assume and retain a contact impression of the golf ball and the club head. The pins are repositionable for subsequent club strokes.

3,730,530
GOLF SWING TRAINING ATTACHMENT
Toshio Oka, No. 12, 2-chome, Kitahorie-dori, Nishi-ku, Osaka-shi, and Zenzaburo Kawanishi, No. 146, 4-chome, Tsukamoto-cho, Higashiyodogawa-ku, Osaka-shi, both of Japan
Filed March 13, 1972, Ser. No. 234,082
Claims priority, application Japan, Dec. 7, 1971, 46/117311
Int. Cl. A63b 69/36
U.S. Cl. 273—186 A **6 Claims**

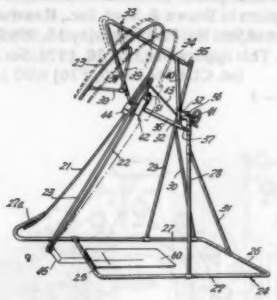


This invention relates to a golf swing training attachment which is attached for use to a golf club, said attachment comprising a whistle and a fixing member, said fixing member comprising a suction disk and a whistle retaining member, said whistle comprising a vibration plate, a vibration plate receiving tray and a cylindrical member for retaining said plate and tray. The suction disk may be provided with an arrow or line which designates the direction in which the attachment is to be fixed to the club head.

3,730,531
GOLF SWING PRACTICE DEVICE
Frank J. Zega, 130 Eastfield Drive, Fairfield, Conn.
Filed March 13, 1972, Ser. No. 234,264
Int. Cl. A63b 69/36
U.S. Cl. 273—191 A **9 Claims**

A mechanical instruction apparatus for guiding a golf club during a practice swing. The apparatus has a minimum amount of supporting structure for a pair of closely-spaced, curved rails adapted to loosely receive and guide the lower shaft portion of a golf club and for a guide rail adapted to guide the club on the follow-through, and an improved carriage for supporting the upper portions of the rails and adjusting the height and angle of said rails to accommodate students of different height. The upper sections of the rails are adapted

to be shifted automatically during the practice swing to a new position out of the path of the follow-through of the practice



swing, thus enabling the completion of a proper swing, and a flexible bumper is provided to engage and limit shifting movement of the upper sections.

3,730,532

COMBINATION FOUR-CHANNEL TWO-CHANNEL STEREOPHONIC ENDLESS CARTRIDGE TAPE PLAYER

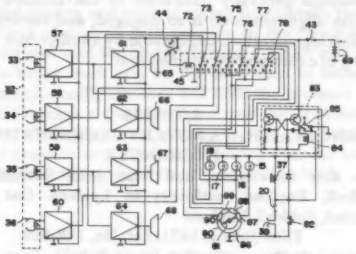
Mitsugu Miyamoto, Arigesaki, Matsumato, Japan, assignor to Victor Company of Japan, Limited, Yokohama, Japan

Filed June 7, 1971, Ser. No. 150,539

Claims priority, application Japan, June 9, 1970, 45/50102

Int. Cl. G11b *21/12, 15/12, 21/08*

U.S. Cl. 274—4 G **4 Claims**



A tape player adapted to play both a conventional two-channel stereophonic cartridge tape and a four-channel stereophonic cartridge tape developed recently. The tape player is capable of sensing whether the tape inserted in the player is a two-channel tape or four-channel tape and is capable of switching reproducing circuits between two-channel and four-channel stereophonic systems in accordance with the type of cartridge tape inserted in the player. The tape player is also capable of indicating whether the stereophonic recording being played back is of the two-channel system or four-channel system and at the same time indicating the program of the recording.

3,730,533

MAGNETIC TAPE CARTRIDGE REMOVING APPARATUS

Itsuki Ban, 829, Higashi-Oizumimachi, Nerima-ku, Tokyo, Japan

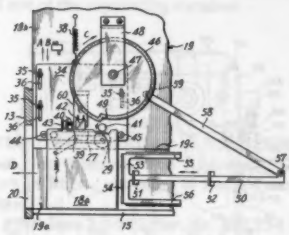
Filed Sept. 28, 1970, Ser. No. 75,875

Claims priority, application Japan, Sept. 26, 1969, 44/76236

Int. Cl. G11b *15/26, 23/12*

U.S. Cl. 274—4 F **3 Claims**

In a tape player utilizing a plurality of magnetic tape cartridges for playing a vertical stack of a plurality of cartridges from the lowermost to the uppermost in succession in a bottomless enclosure, a magnetic tape cartridge removing apparatus comprises a player cabinet, a platform provided in the cabinet to allow the lowermost cartridge to rest thereon, a movable deck to which a capstan and a magnetic head and the like are mounted for playing the cartridge resting on the platform and in the play position, deck driving means for reciprocally moving the movable deck between the positions to engage the cartridge in the play position and to disengage the same, and a pushing member for pressedly moving the cartridge in the play position from the play position during the time that the deck is moved from the reproducing position by rotational force of the capstan.



3,730,534

ENDLESS MAGNETIC TAPE CARTRIDGE REMOVING APPARATUS

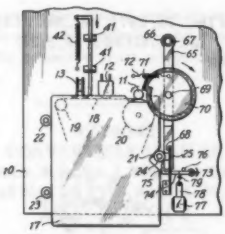
Itsuki Ban, 829, Higashi-Oizumimachi, Werima-ku, Tokyo, Japan

Filed June 16, 1070, Ser. No. 46,703

Claims priority, application Japan, June 18, 1969, 44/57040; June 23, 1969, 44/48941; May 11, 1970, 45/45027

Int. Cl. G11b *5/00*

U.S. Cl. 274—4 B **4 Claims**



An endless magnetic tape cartridge removing apparatus for a tape cartridge player which comprises a retention member engageable with a notch of the cartridge and bring the latter into a predetermined operative position, a displaceable member holding the retention member, a device for moving the displaceable member to the position where the retention member is escaped from the notch of the cartridge, and a pushing device for moving the cartridge away from the operative position whereby the cartridge is removed from the operative position by the pushing device when the retention member is escaped from the notch.

3,730,535

CARTRIDGE LOCKING MECHANISM

William B. Huber, Park Forest, Ill., assignor to Motorola, Inc., Franklin Park, Ill.

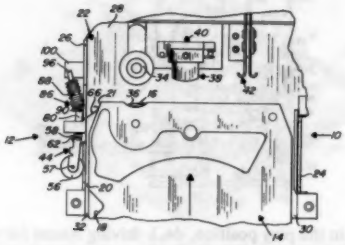
Filed April 23, 1971, Ser. No. 136,923

Int. Cl. G11b *25/06, 5/00*

U.S. Cl. 274—4 B **13 Claims**

A cartridge locking mechanism for a tape player includes a roller arm mounted for pivotal movement on a first mounting

post and a bistable spring arrangement coupled between the roller arm and a second mounting post to operate the roller arm between two stable positions and to retain the mechanism in a mounted condition. A leaf spring connected to the roller arm extends into a cartridge receiving tunnel of the tape



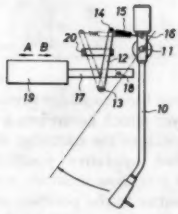
player for deflection by a cartridge inserted thereinto. Deflection of the leaf spring snaps the bistable spring arrangement from a first to a second stable state causing the roller arm to engage and be received in a notch in the side wall of a cartridge to removably secure the latter in the tunnel.

3,730,536

PICKUP ARM DEVICE FOR CANCELING BIASING FORCES OF STYLUS

Yoshiyuki Yuki, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu-shi, Shizuoka-ken, Japan

Filed Dec. 28, 1971, Ser. No. 213,024
Int. Cl. G11d *3/12, 3/28*
U.S. Cl. 274—23 R **3 Claims**



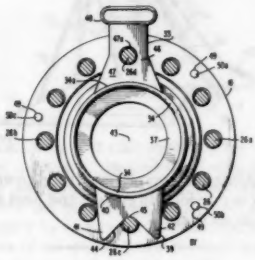
A mechanism for cancelling a force resulting from a rotating disk record and acting on a pickup arm stylus, during sound reproduction, in a direction from the peripheral portion of the record toward the center thereof comprises a coiled spring imparting a counterbalancing force to the stylus to cancel the former force. The mechanism of the invention further includes a pivoted lever permitting the spring force to act on the arm during sound reproduction and releasing the counterbalancing force thereof until the start, and right after the end, of record playing, whereby the stylus can be set down into the lead-in groove of the disk record or lifted up from the final portion of the record groove in the right vertical direction.

3,730,537

METHOD AND APPARATUS UTILIZING HANDLED SEAL FOR SUBMERGIBLE COUPLING

Delbert R. Ward, and William R. Rochelle, both of Houston, Tex., assignors to Brown & Root, Inc., Houston, Tex.

Division of Ser. No. 824,959, May 15, 1969, Pat. No. 3,620,554. This application July 20, 1971, Ser. No. 164,359
Int. Cl. F16l *23/00*; F16j *9/00*
U.S. Cl. 277—1 **10 Claims**



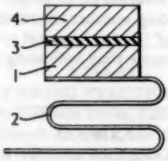
Seal method and apparatus for use in a submerged coupling and including a generally annular seal operable to be interposed between two conduit couplings. A bifurcated alignment web connected with the seal is operable to engage a stud bolt of the conduit couplings and to responsively position the seal in generally longitudinal alignment with, and interposed between, the conduit couplings. A handle connected with the seal projects generally outwardly of the conduit couplings when the alignment web is so engaged, and carries an alignment locking aperature engageable by another bolt to impede skewing or canting of the aligned seal.

3,730,538

RUBBING SEAL FOR A ROTARY REGENERATIVE HEAT EXCHANGER

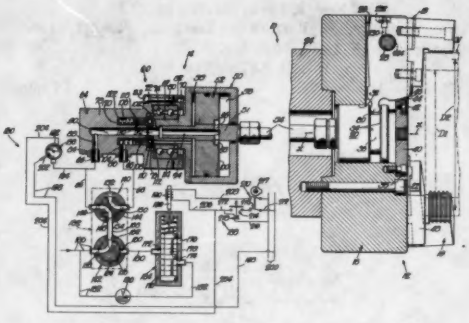
Calvin Eric Silverstone, and Alan John Surrall, both of Solihull, England, assignors to Leyland Gas Turbines Limited, Solihull, England

Filed June 1, 1971, Ser. No. 148,529
Claims priority, application Great Britain, June 26, 1970, 31,069/70
Int. Cl. F16j *15/16*
U.S. Cl. 277—96 R **2 Claims**



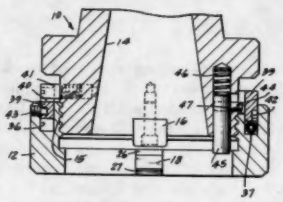
A rubbing seal for engagement with a hot face of a matrix of a rotary regenerative heat exchanger. The seal comprises a ferritic steel base member, a rubbing surface layer including nickel oxide and an intermediate bonding layer of a nickel aluminum compound between the base member and the rubbing surface layer.

3,730,539
CHUCK OF HIGH-LOW OPERATION
Linwood B. Swanson, 81 Centerwood Rd., Newington, Conn., assignor to Cushman Industries, Incorporated, Hartford, Conn.
Filed March 4, 1971, Ser. No. 120,820
Int. Cl. B23b *31/18, 31/30*
U.S. Cl. 279—4 4 Claims



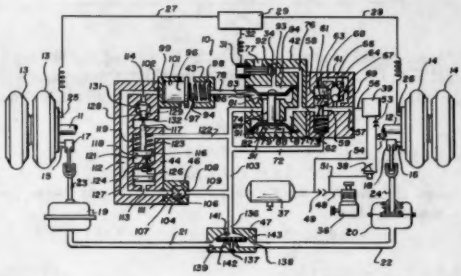
A chuck and an actuating device therefor, of which the chuck features rocker jaws with follower ends, and an axially movable jaw actuator having spaced faces in planes normal to the chuck axis with which the follower ends of the jaws are in line contact, and the actuating device provides a cylinder with a piston therein connected with the jaw actuator, and fluid-pressure distributing and control means sequentially operable to admit fluid of a given high pressure to the chuck-closing cylinder end and vent the chuck-opening cylinder end for exertion of a heavy work grip by the jaws, then to bleed fluid from the chuck-closing cylinder end until the pressure of the fluid therein reaches a given low level and hold it at this level for exertion of a lighter work grip by the jaws, and finally to admit fluid pressure into the chuck-opening cylinder end and vent the chuck-closing cylinder end to open the chuck.

3,730,540
TOOL HOLDER WITH SPRING OPERATED NUT
John L. King, Jr., and Roland G. Koch, both of Frankenmuth, Mich., assignors to Houdaille Industries, Inc., Buffalo, N.Y.
Filed Sept. 9, 1971, Ser. No. 178,920
Int. Cl. B23b *31/04*
U.S. Cl. 279—91 16 Claims



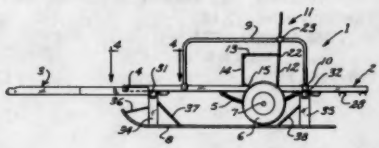
A tool holder includes a hollow supporting member on which there is threaded a locking ring which is urged to its locked position by a spring, there being a combined latch and release pin for holding the locking ring in the unlocked position, and responsive to the reception of a tool to be automatically released for automatically tightening the locking ring. The locking ring has an ear that is received between shoulders that encircle the tool so that tightening of the ring cams the tool into the supporting member, and loosening of the ring cams the tool out of the supporting member.

3,730,541
FLUID PRESSURE BRAKE SYSTEM
John W. Bush, Mt. Clemens, and Andrew E. Cunningham, Detroit, both of Mich., assignors to Borg-Warner Corporation, Chicago, Ill.
Filed June 2, 1972, Ser. No. 259,054
Int. Cl. B60t *8/06*
U.S. Cl. 303—21 F 3 Claims



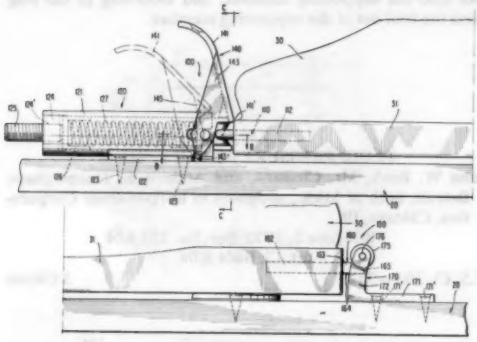
A fluid pressure brake system includes wheel slip control means which provides for reducing the braking pressure in steps in order to conserve fluid while alleviating a locked wheel condition.

3,730,542
CONVERTIBLE TRAILER
Charlie F. Chadwick, R.R. No. 1, Minot, N. Dak.
Filed May 20, 1970, Ser. No. 39,037
Int. Cl. B62b *13/18*
U.S. Cl. 280—9 11 Claims



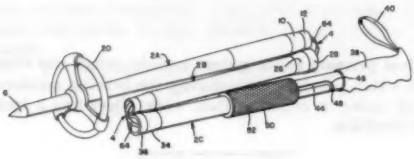
A snowmobile trailer convertible to a sled which can be towed by the snowmobile. The trailer includes skiis which are retractible for highway travel of the trailer. A unique lock mechanism locks the skiis in position and also provides the proper form of connection between the draw bar and frame of the trailer to facilitate loading and to assure that the trailer is used properly.

3,730,543
SAFETY SKI BINDING
James Mitchell Edmund, 6404 Ridge Drive, Washington, D.C.
Filed Jan. 8, 1971, Ser. No. 105,005
Int. Cl. A63c *9/00*
U.S. Cl. 280—11.35 T **22 Claims**



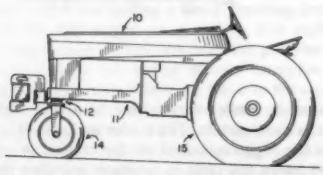
A safety ski binding in which the bottom of the ski boot is held out of contact with the top of the ski to thereby eliminate the influence of frictional forces on the safety release feature.

3,730,544
COLLAPSIBLE SKI POLE
Joseph Hyman, Newton Center, Mass., assignor to Hycor, Inc., Woburn, Mass.
Filed April 1, 1971, Ser. No. 130,161
Int. Cl. A63c *11/22*
U.S. Cl. 280—11.37 L **12 Claims**



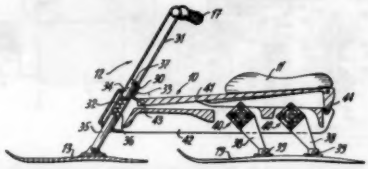
A collapsible ski pole comprising a plurality of interconnected tubular members held together by a flexible cord under tension, and means for releasing the tension on the cord to permit the tubular sections to be disconnected one from the other and arranged in a compact bundle.

3,730,545
TRACTOR WEIGHTS
Aldo Allori, Brookfield, Ill., assignor to International Harvester Company, Chicago, Ill.
Filed Aug. 30, 1971, Ser. No. 175,894
Int. Cl. B60r *27/00*
U.S. Cl. 280—150 E **7 Claims**



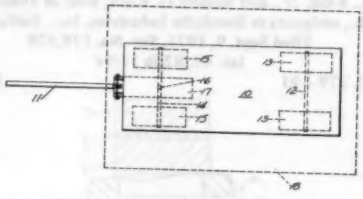
A counterweight assembly is adopted to be secured to a tractor such that the counterweights will not jar against one another. Each weight is provided with an L-shaped aperture in which is extended a corresponding L-shaped member. A bolt extends through each end of the L-shaped member and through an eccentric washer into the mounting bracket. The washer at each end is rotated on its bolt against the adjacent weight, forcing the weights together.

3,730,546
BOBSKI
Jean-Yves Evequoz, Route de la Dixence 17, Sion, Switzerland
Filed Nov. 2, 1970, Ser. No. 85,972
Claims priority, application Switzerland, Nov. 1, 1969, 16307/69; June 15, 1970, 16307/69
Int. Cl. B62b *13/04*
U.S. Cl. 280—16 **1 Claim**



A bobski comprising at least a front ski, a rear ski, a steering column, a handle bar connected to the said steering column, a frame for connecting the steering column to the rear ski, and a resilient suspension device for connecting the frame to the rear ski.

3,730,547
SHEET TRUCK AND THE LIKE
John E. Young, Middletown, Ohio, assignor to Armco Steel Corporation, Middletown, Ohio
Filed May 28, 1971, Ser. No. 147,770
Int. Cl. B60p *9/00*
U.S. Cl. 280—116 **5 Claims**

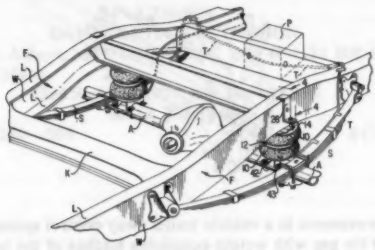


This application discloses an improved truck for moving sheets of steel, coils of steel and the like, from place to place in a plant. The truck is basically a fifth wheel steering, four wheeled truck. An outrigger or skid is secured to the front axle assembly at right angles to the axle and has a length substantially equal to the track of the front wheels of the truck. When the tongue of the truck is moved to turn the front wheels to a position in which the axle is parallel to the centerline of the truck, the outrigger occupies substantially the position of the wheels when the tongue is straight forward. The outrigger is positioned, say, a half inch above floor level so that its stabilizing effect comes into play upon a very slight tilt of the truck.

3,730,548
VEHICLE AIR-SPRING

Ellis B. Thaxton, Arlington, Tex., assignor to Ride-Rite Corp., Arlington, Tex.

Filed June 24, 1971, Ser. No. 156,189
Int. Cl. B60g 11/46
U.S. Cl. 280—124 F **3 Claims**

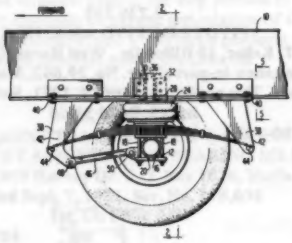


An air-spring assembly for mounting in a vehicle as a part of the vehicle suspension and including a pressure-inflatable elastomeric body having rigid end plates by which it is mounted between a chassis member and an axle member of the vehicle, the upper end plate carrying an inverted U-bracket which bears against the bottom of the frame member which extends longitudinally of the vehicle and is clamped thereto by bolted straps, and the lower end plate carrying a saddle plate straddling and secured to the axle member which extends transversely of the vehicle.

3,730,549
DROP-AXLE SUSPENSION SYSTEM

Stephen Turner, Jr., Berlin Center, Ohio, assignor to Charles E. Wern, Jr.; David S. Dennison, Jr. and Stephen Turner, Jr., all of Warren, Ohio

Division of Ser. No. 12,050, Feb. 17, 1970. This application July 6, 1971, Ser. No. 160,125
Int. Cl. B60g 11/46
U.S. Cl. 280—124 F **5 Claims**

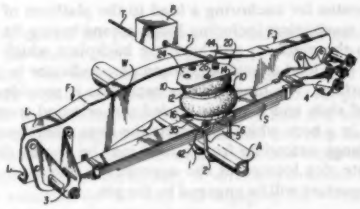


There is provided in auxiliary axle suspension system for wheeled vehicles an improvement for insuring the safety of said suspension when under heavy load, particularly about 6,000 lbs. per axle or greater, which comprises an axle having mounted at its outer extremities two wheels on either side thereof for carrying such a heavy load along the path of travel of the vehicle. Inwardly of each pair of wheels and immediately adjacent to each respective pair of wheels there is provided a leaf spring of a plurality of leaves and means for connecting the leaf spring at about its respective ends to the longitudinal I-beam frame members of the vehicle and extending longitudinally on either side thereof. Each leaf spring has its intermediate portion overlying and being secured by bolt means to the axle such that the leaf springs are normally biased upwardly to raise the axle and the wheels mounted thereon above the surface along which the vehicle travels. Juxtapositioned between each leaf spring and its respective frame member is at least one vertically flexible pneumatic chamber which may be expanded or contracted vertically by applying pneumatic pressure thereto to thereby bias the axle downwardly against the force exerted by the springs to lower the wheels mounted thereon into contact with the vehicle travel surface. Torque arms are provided which extend in the forward direction of the vehicle and are connected between the bolt means for connecting the axle to the frame member and the means for connecting each respective leaf spring at about their ends to the vehicle. In addition, the leaf springs are not secured to the means which connect them at about their ends to the frame member of the vehicle, but rather, are connected in a manner which allows them to slide longitudinally therewithin. Upon braking under heavy load, the leaf springs are protected from undue torque forces by the torque arms and the slidable nature of the leaf spring connection.

3,730,550
AIR-SPRING ASSEMBLY FOR VEHICLES

Ellis B. Thaxton, Arlington, Tex., assignor to Ride-Rite Corp., Arlington, Tex.

Filed June 24, 1971, Ser. No. 156,188
Int. Cl. B60g 11/46
U.S. Cl. 280—124 F **2 Claims**

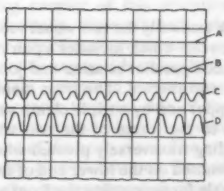


An air-spring assembly for mounting in a vehicle as a part of the vehicle suspension and including a pressure-inflatable elastomeric body having rigid end plates by which it is mounted between a chassis member and an axle member of the vehicle, the upper end plate carrying an inverted L-shaped bracket which is secured to the side of a frame member which extends longitudinally of the vehicle, and the lower end plate carrying an inverted U-bracket secured to the U-bolt and clamping plate assembly of the leaf spring mounted on the axle member of the vehicle.

3,730,551
IRREVERSIBLE ENERGY ABSORBING AIR BAG SYSTEM

John J. Sack, Bloomfield Hills, Mich., and Steven Acs, Sarnia, Ontario, Canada, assignors to Allied Chemical Corporation, New York, N.Y.

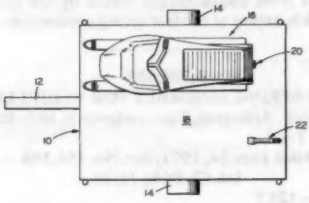
Filed Jan. 11, 1971, Ser. No. 105,294
Int. Cl. B60r 21/10
U.S. Cl. 280—150 AB **2 Claims**



This invention relates to energy absorption in a passenger restraint system as a result of the use of an expansible pas-

senger restraint bag. More specifically, this invention relates to the introduction of an expansible energy absorbing bag which will not return to its original size upon expansion and which is utilized to restrain forward motion of a passenger within a motor vehicle.

3,730,552
LOAD ANCHORING DEVICE
Russell C. Clark, R.F.D. No. 1, Higganum, Conn.
Filed Dec. 23, 1971, Ser. No. 211,317
Int. Cl. B60p *7/00*
U.S. Cl. 280—179 R **14 Claims**

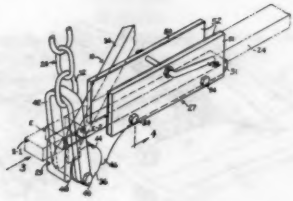


Apparatus for anchoring a load to the platform of a transporting mechanism including hinge means having its base affixed to the platform and having a backplate which may be pivoted into load engaging position perpendicular to the platform surface. The hinge means backplate is provided with a series of slots and a spring loaded pin oriented transversely thereto in a bore which intersects the slots whereby an apertured flange extending from a load may be passed through a backplate slot located at the appropriate elevation and the flange aperture will be engaged by the pin.

3,730,553
FRONT FORK ASSEMBLY FOR TWO WHEEL VEHICLES
John W. Harman, 501 Elefa Street, Roseville, Calif.
Filed Nov. 17, 1971, Ser. No. 199,642
Int. Cl. B62k *21/02*
U.S. Cl. 280—277 **5 Claims**

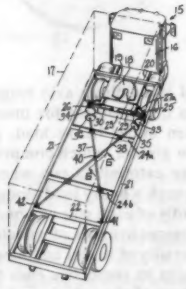
A front fork assembly for two wheel vehicles such as motorcycles and bicycles which includes a pair of tubular trusses arranged in spaced parallel relation and joined by a handle bar on the upper end thereof. The truss members are joined adjacent their upper end by a triple clamp assembly for connecting the forks to the frame of the two wheel vehicle. A forwardly extending transversely pivoted wheel support member is pivotally mounted on the lower end of each of said forks and joined by an axle for supporting the front wheel. A sprung support is adjustably secured to the rear end of the wheel support member with the spring located within the tubular truss member.

3,730,554
VEHICLE TRAILER SWAY CONTROL SYSTEM
Eldon John Saunders, 13420 Frazho, Warren, Mich.
Filed March 17, 1971, Ser. No. 125,296
Int. Cl. B62d *53/00*
U.S. Cl. 280—406 A **8 Claims**



Improvement in a vehicle trailer sway control system is disclosed for use with weight-equalizing hitches of the type having a pair of weight-equalizing bars and a pair of lifting means for respectively lifting the free ends of said bars, said lifting means respectively supporting a pair of laterally and outwardly projecting ledges from the trailer tongue, said ledges being supported in respective hanging positions on opposite sides of said trailer tongue, said improvement consisting of a pair of friction brake means constructed as removeable attachments for existing weight-equalizing hitches of said type by comprising, respectively, a pair of elongate supporting members having respective open-ended cavities therein engageable with said ledges, respectively, for rendering said friction brake means capable of being placed over and lowered upon said ledges, respectively, said elongate supporting members, when engaged on said ledges, respectively, being held fast in respect thereto and being disposed beneath said equalizing bars, respectively, and in weight-supporting relationship thereto, each said elongate supporting member carrying thereon brake shoe means moveable in respect thereto and force-applying means operative upon said brake shoe means for applying braking pressure against the respective equalizing bar to resist trailer sway.

3,730,555
PIVOT LIMITING ASSEMBLY
Anthony T. Keller, 10 Hilton Dr., West Haven, Conn.
Continuation-in-part of Ser. No. 39,062, May 20, 1970, abandoned. This application April 9, 1971, Ser. No. 132,793
Int. Cl. B62d *53/06*
U.S. Cl. 280—432 **15 Claims**



This disclosure relates to apparatus for use in combination with a towing vehicle and a towed vehicle pivotally connected in tandem. A pivot limiting assembly comprising a first pair of stop blocks is resiliently mounted one on each of the towing vehicles, and a second pair of stop blocks is supported one on

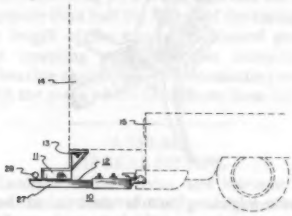
each side of the forward portion of the towed vehicle and positioned to contact one of the first pair of stop blocks when the angle of pivot between the vehicles has reached a predetermined limit. The support members together with the stop blocks thereon are movable out of the line of contact with the second pair of stop blocks whereby the angle of pivot may exceed a predeter-mined limit.

3,730,556

CAMPER HITCH EXTENSION

Tony M. Aldape, and Frank Aldape, both of 4121 Hill Road, Boise, Idaho

Filed Sept. 23, 1971, Ser. No. 182,998
Int. Cl. B60d 1/06
U.S. Cl. 280—500 **4 Claims**



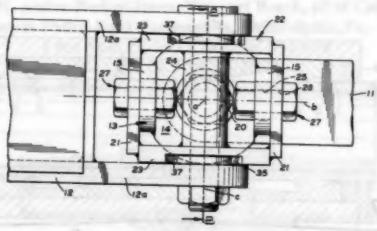
A trailer hitch extension for truck-mounted campers having rearward portions cantilevered with respect to the truck, comprising: a step-bracket member having a forwardly disposed bracket plate operable to mount the hitch extension to the lowermost rearward terminal end of the camper and a rearwardly disposed step portion operable to provide a step-like means to the camper, both suitably disposed respectively from an upstanding riser wall of the step-bracket member; and a drawbar assembly pivotally dependingly carried by the step-bracket member and being provided with a ball hitch coupler at the forwardmost terminal end of the drawbar operable to detachably fasten said drawbar to a commonly known ball-hitch disposed at the midpoint of the rearwardmost terminal end of the truck, a carrier means disposed at a point midway on the lowermost terminal edge of the step portion of the step-bracket member operable to permit articulation of the drawbar laterally and vertically, and a ball hitch platform disposed at the rearwardmost terminal end of the drawbar.

3,730,557

UNIVERSAL JOINT TRAILER HITCH WITH COUPLING PIN SOCKET ALIGNING AND BEARING MEANS

Rodney S. Cox, 919 Harvey Dr. P.O. Box 1026, Marion, Ohio

Filed Sept. 7, 1971, Ser. No. 178,036
Int. Cl. B60d 1/00
U.S. Cl. 280—504 **5 Claims**



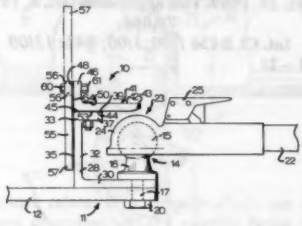
A trailer hitch for connecting a draft member on a towing vehicle to a draft member on a trailer to be towed. The hitch includes positive connections between the two draft members which provide pivoting about three axes or universal movement. The hitch also provides a removable coupling pin between the two draft members with pin-socket aligning means which positively align the sockets for receiving the pin and thereafter serve as bearing means to prevent excessive shear forces on the pin.

3,730,558

TRAILER HITCH SAFETY DEVICE

Carl R. Litzenberger, Endicott, Wash.

Filed Feb. 28, 1972, Ser. No. 229,647
Int. Cl. B60d 1/06
U.S. Cl. 280—511 **7 Claims**



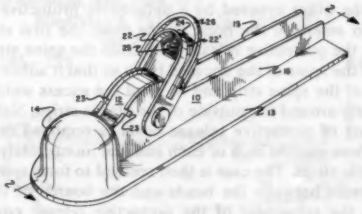
A safety device for preventing the inadvertent disengagement of the socket from the ball in a ball and socket type trailer hitch. The safety device has an upright standard affixed to the hitch with a stop mounted on the standard for pivotable movement to a position directly over the ball and socket to prevent their disengagement. The standard and stop have vertical surfaces that are aligned with each other when the stop extends directly over the socket. A vertically oriented lever is pivotally mounted on the stop for engaging the vertical surfaces to prevent the stop from being pivoted.

3,730,559

TRAILER HITCHING COUPLER

James D. Ray, Route 5, Box 208, Nampa, Idaho

Filed Dec. 20, 1971, Ser. No. 209,769
Int. Cl. B60d 1/06
U.S. Cl. 280—513 **1 Claim**



The trailer hitching coupler of this invention includes a body having a horizontally disposed body plate, a dome fastened on the lower side of the forwardmost terminal end of the body plate to operably engage a hitching ball, and a pair of parallelly upstandingly disposed cam-supporting walls fastened to the upper-most terminal side of the body plate from the rearwardmost terminal side of the dome to the rearwardmost terminal end of the body plate. The coupler also includes a cam assembly carried between the cam-supporting walls distally from the rearwardmost terminal end of the dome. The cam assembly includes an eccentric-type cam having portions of its cam axis projecting through each of the cam-supporting walls, a cam follower having a centrally

disposed hole which is operable to ride about the outer circumference of the cam, and an actuator arm fastened to the outwardly projecting portions of the cam axis. The actuator arm is provided with locking means operable to lock the cam assembly when the assembly is in engagement with the hitching ball.

3,730,560

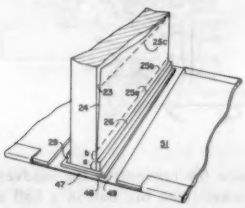
METHOD OF FORMING AND CASING BOOKS AND PRODUCT THEREOF

William H. Abildgaard, Los Altos Hills, and Charles T. Groswith, III, Palo Alto, both of Calif., assignors to Abildgaard Laboratories, Inc., Mountain View, Calif.

Continuation-in-part of Ser. No. 799,045, March 13, 1969, Pat. No. 3,596,929, and a continuation-in-part of Ser. No. 872,134, Oct. 29, 1969. This application Oct. 8, 1970, Ser. No. 79,086

Int. Cl. B42d *1/00, 3/00;* **B42c** *15/00*

U.S. Cl. 281—21 **7 Claims**



An uncased book is first prepared. The outside end papers on each of the top and bottom of the book consists of a sheet of paper, flexible plastic, cloth, or the like, coated with pressure-sensitive adhesive with the sensitive surface outermost and protected by a protective release covering scored in at least two lines adjacent to the inner edge. Spaced holes are punched, drilled or otherwise formed adjacent to the inside margin of each sheet of the book, including the end papers. A first narrow strip of plastic having projecting studs spaced the same as the holes and a second narrow strip formed with corresponding holes are provided. The studs are inserted through the holes in the end-papers, sheets and second strip and the strips forced toward each other, compressing the sheets therebetween. The excess stud lengths are cut off and heads similar to rivet heads formed, securing the uncased book in assembled condition. A case is provided similar to conventional book cases. Initially such case has a central spine strip of double-face, pressure-sensitive material, one face adhered to the cover, the other covered by a detachable protective release strip. To assemble the book to the case, the first step is to remove the protective release strip from the spine strip, then to press the spine of the uncased book so that it adheres to the middle of the spine strip and to bend the excess width of the spine strip around the outside of the plastic strips. Next a narrow band of protective release cover is removed to expose about three-eighths inch of each end leaf immediately outside the plastic strips. The case is then creased to form spine beads and creases between the beads and the boards of the case. Finally, the remainder of the protective release covers are removed, causing the end leaves to be secured to the insides of the covers of the case.

3,730,561

SWIVEL-TYPE CARRIER FOR AUTOMATIC AIR HOSE CONNECTOR

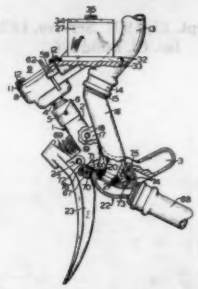
Fred Temple, Pittsburgh, and William H. Reno, Monroeville, both of Pa., assignors to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed April 17, 1972, Ser. No. 244,391

Int. Cl. F16l *55/00*

U.S. Cl. 285—12 **15 Claims**

This invention relates to a swivel-type carrier for rockably supporting an automatic-type air hose connector on and beneath the car coupler of a railway vehicle. The carrier comprises two members, one end of a first member having a resilient connection with the car coupler and the other end constituting a hollow cylinder that is rigidly connected to one end of a sleeve disposed therein. The second member of the carrier is in the form of an off-set arm one end of which has the automatic-type air hose connector removably secured thereto. The other end of this second member constitutes a second hollow cylinder rockably mounted on the other end of the sleeve, while a manually operable lock carried thereby is



disengaged from a locking member secured to the lower end of this sleeve, to a position in which manual coupling between the automatic-type air hose connector and a standard manual-type air hose coupling carried in the end of the air hose provided at the adjacent end of another car may be effected. The construction and arrangement of the elements comprising the swivel-type carrier and lock therefor are such that, upon movement of the other railway car away from the one car, subsequent to uncoupling the couplers between these two cars, far enough to cause disengagement between the automatic-type air hose connector on the one car and the standard manual-type air hose coupling on the other car, the automatic-type air hose connector on the one car is automatically returned to and locked in the position for automatic coupling with a like automatic-type air hose connector carried at the adjacent end of a third car that may be coupled to the one car.

3,730,562

PIPE JOINT CONNECTING SMOOTH-ENDED PLASTIC PIPES FOR UNDERWATER USE

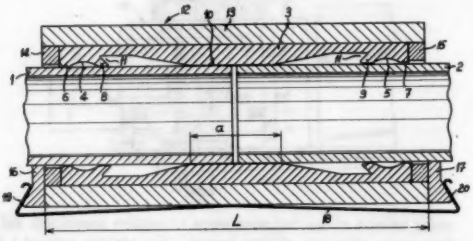
Pierre Viazzi, Bormes Les Mimosas, France, assignor to Societe Internationale D'Application De Procedes Industriels (S.I.A.P.I.), Panama, Panama

Filed Nov. 22, 1971, Ser. No. 201,066

Claims priority, application Switzerland, Dec. 22, 1970, 19,025; June 9, 1971, 8,420

Int. Cl. F16l *17/00*

U.S. Cl. 285—110 **5 Claims**



A pipe joint connecting smooth-ended plastic pipes for underwater use, comprises a sleeve of resilient material fitted on

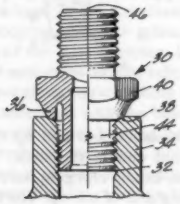
the adjacent smooth ends of two plastic pipes. The sleeve has, at each of its ends, a circular throat having, in longitudinal section, a concave portion bounded by two lips, the edges of the lips being disposed on circles of smaller diameter than the outside diameter of the pipes in the undeformed condition of the lips, the lips being in contact with and resiliently deformed by the outer surface of the pipes. The sleeve has at its central zone a portion of a thickness greater than the thickness of the sleeve adjacent the lips, this thickened portion having an inner cylindrical surface of circular cross section having a diameter corresponding to the outside diameter of the pipes and contacting the outer surface of the pipes on either side of the zone in which the pipes most closely approach each other. The resilient sleeve is housed in a casing, and readily detachable coupling means releasably retain the pipe ends in the sleeve, these coupling means comprising abutments secured to each pipe and in contact with opposite ends of the casing. The distance separating the frontal face of each abutment and the end of the corresponding pipe is less than half the length of the casing but greater than half the length of the casing diminished by half the length of the central thickened portion of the sleeve. The coupling means further comprise members detachably bearing against and interconnecting surfaces of the abutments on the pipes which are remote from the casing.

3,730,563

LIP SEAL FITTING

Francis J. Hanback, Palos Verdes, and Norman F. Robinson, Manhattan Beach, both of Calif., assignors to McDonnell Douglas Corporation, Santa Monica, Calif.

Filed Feb. 22, 1971, Ser. No. 117,656
Int. Cl. F16l *55/00*
U.S. Cl. 285—114 **1 Claim**



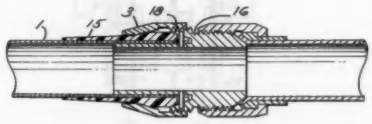
A fitting for establishing a sealed connection with a boss, which fitting includes a semi-flexible cantilevered sealing lip about the periphery thereof, an undersized threaded portion which aligns and pulls the sealing lip against a chamfered boss surface when the fitting is tightened thereto and a relieved portion between the threaded portion and the lip to enable predetermined stretching and yielding to protect the boss from over-torquing of the fitting and overpressures which may be applied thereto.

3,730,564

TAPERED COMPRESSION END FITTING

Wilfred H. Bachle, Long Beach; Gilbert Segovia, Santa Ana, and H. Andre Parker-Jones, Newport Beach, all of Calif., assignors to Philco-Ford Corporation, Philadelphia, Pa.

Filed Nov. 15, 1971, Ser. No. 198,658
Int. Cl. F16l *33/20*
U.S. Cl. 285—115 **1 Claim**



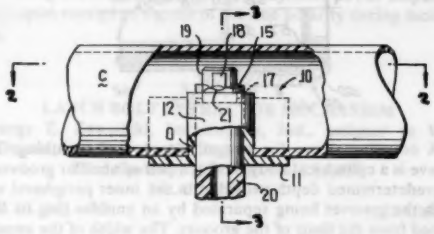
This invention describes a unique end fitting for use with a single or multi-layer, braid-covered cast membrane tube of the type used in reverse osmosis fluid separation systems and the like. It can be used as a coupling between dissimilar tubing or two tubes of like characteristics.

3,730,565

QUICK CONNECT-DISCONNECT COUPLER

Frederick W. Steudler, Jr., Lancaster, Pa., assignor to The Vallorbs Jewel Company, Lancaster, Pa.

Filed Feb. 29, 1972, Ser. No. 230,387
Int. Cl. F16l *41/00*
U.S. Cl. 285—158 **9 Claims**



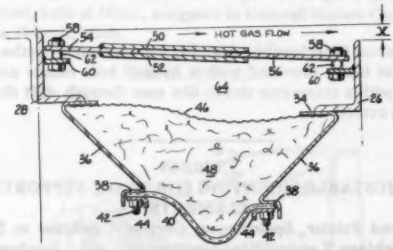
This disclosure relates to a coupler which can be quickly connected and disconnected, the coupler being defined by male and female elements adapted to be joined together by relative and successive axial and rotational movement, the female element and male element in the assembled position thereof having opposing annular shoulders between which is received a gasket, and cooperative means for axially moving the shoulders toward each other upon relative rotation of the male and female elements whereby the gasket is compressed to form a seal between the elements. Movement is imparted to the shoulders by a radially directed lug of the male element which functions as a cam follower by moving along an annular end surface of the female element which in addition to being inclined circumferentially has a plurality of lands and valleys with the latter interlocking with the lug to selectively vary the distance between the shoulders and thus the degree which the gasket may be compressed.

3,730,566

DUCT CONNECTOR

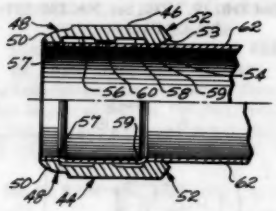
John Kazmierski, Jr., Ringoes; Benjamin Lawson, Jr., Somerset; Craig Edward Thornton, Flemington, and Gerard Louis Verrelli, Jr., Manville, all of N.J., assignors to Johns-Manville Corporation, New York, N.Y.

Filed May 3, 1971, Ser. No. 139,325
Int. Cl. F16l *27/02*
U.S. Cl. 285—229 **6 Claims**



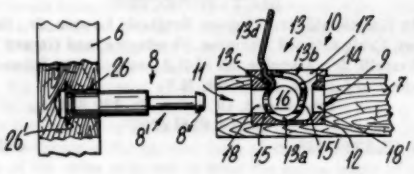
A duct connector for connecting and accommodating relating movement (expansion, contraction and misalignment between openings of ducts carrying solid-laden corrosive hot gases. The passage through the expansion joint is lined with plates capable of relative sliding and tilting movement in three dimensions in a manner to maintain a shield against the gases passing therethrough.

3,730,567
COUPLING SLEEVE
Frank R. Webster, Tarzana, Calif., assignor to Axial Corporation, Burbank, Calif.
Filed July 8, 1970, Ser. No. 53,196
Int. Cl. F16l 13/14
U.S. Cl. 285—382.4 **11 Claims**



A coupling sleeve for swaged attachment to tubing. The sleeve is a cylindrical body having a pair of annular grooves of a predetermined depth provided in the inner peripheral wall with the grooves being separated by an annular ring or land raised from the floor of the grooves. The width of the annular ring in the axial direction is such that tubing swaged into the grooves tends to assume a separate bend adjacent each land edge and to remain essentially flat in the area intermediate the two edges. The inner diameter of the cylindrical body in the area of the annular ring is arranged such that it is less than the inner diameter of the body in the area of the annular grooves and greater than the inner diameter of the cylindrical body in the area remote from the grooves thereby resulting in a two stage application of force to the tube walls during the swaged attachment operation. In certain embodiments a raised portion intermediate the sleeve ends provides oppositely facing abutment surfaces on the exterior of sleeve.

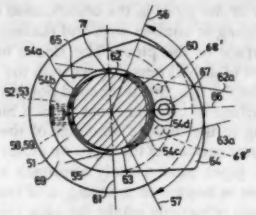
3,730,568
CONNECTOR
Fiorello Giovannetti, Via Marciano, 4, Milan, Italy
Filed March 15, 1971, Ser. No. 124,014
Int. Cl. F16b 21/02
U.S. Cl. 287—20.927 **6 Claims**



A device for releasibly clamping two elements together, one element being provided with a headed bolt means and the other with a transverse sleeve-like cam through with the bolt means extend.

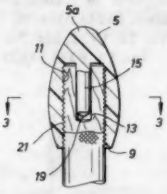
3,730,569
ADJUSTABLE MOUNTING FOR SHAFT-SUPPORTED ELEMENTS
Raimund Feinler, Spaichingen, Germany, assignor to Firma Maschinen-Konstruktions-Gesellschaft mit beschrankter Haftung, Spaichingen, Germany
Filed Sept. 2, 1971, Ser. No. 177,324
Claims priority, application Germany, Sept. 7, 1970, P 20 44 238.0
Int. Cl. F16d 1/06
U.S. Cl. 287—52.08 **2 Claims**

A torque-transmitting element, such as a chuck, cam or abutment, to be adjustably mounted on a rotating or fixed shaft has an axial bore of the same diameter as the shaft but with a sectoral zone of larger radius extending over an arc between 90° and 150°. Opposite that zone, a radial bore



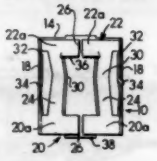
threaded to receive a setscrew lies in the plane bisecting the arc whereby a tightening of the setscrew wedges the shaft between two arcuate bore portions flanking the sectoral zone.

3,730,570
DRUMSTICK
I. H. Brochstein, 5230 Loch Lomand, Houston, Tex.
Filed May 6, 1971, Ser. No. 140,826
Int. Cl. F16d 1/06
U.S. Cl. 287—53 R **6 Claims**



An improved drumstick and end tip therefor which is affixed to the reduced end of the stick. The reduced end is characterized by an axially elongate bore which is adapted to receive an extending arm of the tip. The tip is of substantially frusto-oval configuration and is characterized by an axial bore of diameter sufficient to fit over the reduced end of the stick. At the base of the bore internally of the tip is the longitudinally extending arm of a length slightly less than the bore in the end of the stick. Affixation of the tip to the stick requires insertion of the stick into the tip bore and concomitant insertion of the arm into the stick bore thereby markedly enhancing frictional engagement between the tip and stick.

3,730,571
KNOB FASTENER
Harold S. Van Buren, Jr., Lexington, Mass., assignor to TRW Inc., Cleveland, Ohio
Filed Feb. 28, 1972, Ser. No. 229,730
Int. Cl. F16d 1/06
U.S. Cl. 287—53 H **7 Claims**



A fastener for releasably coupling a shaft end to a knob, handle or the like cooperating member, and wherein, the

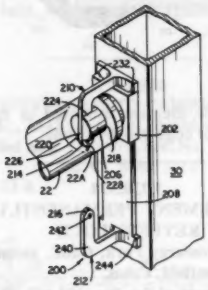
fastener has a hollow housing portion for receiving the shaft and a pair of bandlike means thereon connected by a depressed resilient web providing a leaf spring connection with the body.

3,730,572

SHORING STRUCTURE

Clayton R. Ballou, 136 Baltrusal Place, San Ramon, Calif.

Division of Ser. No. 846,759, Aug. 1, 1969, Pat. No. 3,676,972.
This application May 20, 1971, Ser. No. 145,980
Int. Cl. E04g 7/22
U.S. Cl. 287—53.5 **3 Claims**



Disclosed herein are shoring structures having bases and telescoping members, each shoring structure being fabricated of square tubing. In one embodiment of the structure, square tubing of the telescoping member telescopes inside and along square tubing of the base. In a second embodiment, square tubing of the telescoping member telescopes outside and along square tubing of the base member. In yet another embodiment both inner and outer square tubing of the telescoping member telescopes along square tubing of the base.

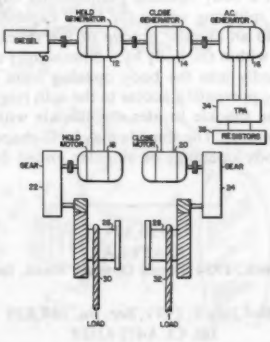
Lock means are associated with the bases and telescoping members to lock thereto cross bracing between base members, telescoping members, etc. Such lock means include a slidable member which is slidable to a position holding the end portion of a cross brace, and to a position freeing the end portion of the cross brace.

3,730,573

SYSTEM FOR REGENERATIVE LOAD ABSORPTION

Alvin M. F. Vance, Williamsville, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 7, 1972, Ser. No. 224,203
Int. Cl. B60l 7/04
U.S. Cl. 290—17 **4 Claims**



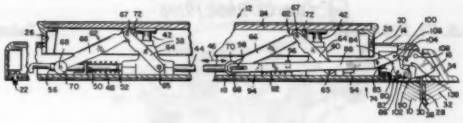
A system for regenerative load absorption is provided for an arrangement in which a prime mover drives a plurality of d.c. generators arranged on a common shaft, and cooperating to energize a plurality of d.c. motors. An a.c. generator is also coupled to the common shaft. A thyristor power amplifier is connected to the a.c. generator and to a dissipative load, the power amplifier transferring power from the a.c. generator to the dissipative load in response to trigger signals which are supplied from a gating amplifier. Regenerative sensing apparatus is coupled to the gating amplifier and to the d.c. generators-d.c. motors to provide signals of one polarity when the net d.c. generator power requirements are for motoring, and signals of another polarity when the net d.c. generator power requirements are for generating, the gating amplifier delivering the trigger signals to the thyristor power amplifier only upon receipt of signals of the one polarity during motoring.

3,730,574

LATCH BOLT RETRACTOR MECHANISM

George Z. Zawadzki, Indianapolis, Ind., assignor to Von Duprin, Inc., Indianapolis, Ind.

Filed April 19, 1971, Ser. No. 135,028
Int. Cl. E05c 9/02
U.S. Cl. 292—92 **23 Claims**



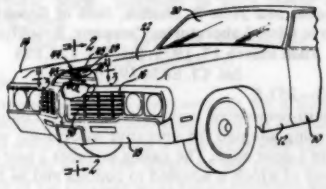
A panic exit latch and actuator assembly comprising a rectilinearly moveable actuator element arranged in a housing means to traverse a door, a panic bar traversing the door and supported for rectilinear movement outwardly and inwardly relative to the housing means, and toggle-like linkage means providing an operative connection between the panic bar and the actuator element to move the actuator element from its latch-projected position to its latch-retracted position in response to movement of the panic bar inwardly. The connection between the actuator element and the latch bolt includes a lever member mounted for pivotal movement about a vertical axis, the lever member providing first and second rigid arms. First linkage means provides a connection between the actuator element and the first arm and second linkage means provides a connection between the latch bolt and the said second arm.

3,730,575

CLOSURE LATCH

Alfonsas Arlauskas, Troy, and Lloyd W. Rogers, Jr., East Detroit, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed June 3, 1971, Ser. No. 149,569
Int. Cl. E05c 3/26
U.S. Cl. 292—216 **4 Claims**



A closure latch for releasably securing a vehicle closure in a closed position and adapted for operation by a remote actua-

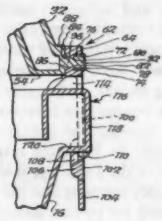
tor operatively connected to the latch, the latch including a lock bolt rotatable between latched and unlatched positions corresponding to the open and closed positions of the closure, a detent lever operatively connected to the remote actuator and rotatable thereby between a retracted position engaging a detent shoulder on the bolt and an extended position releasing the shoulder, a cam on the bolt, and a follower on the detent lever. After the detent lever is actuated to release the bolt, movement of the latter toward the unlatched position thereof initiates engagement between the cam and the follower which thereafter cooperate to positively restore the detent lever and connected remote actuator to their original positions in response to further movement of the bolt toward the unlatched position.

3,730,576

PLASTIC CONTAINER AND LATCH

Peter T. Schurman, Woodbridge, Conn., assignor to The Plastic Forming Company, Inc., Woodbridge, Conn.

Filed Feb. 3, 1971, Ser. No. 112,354
Int. Cl. E05c *19/08*
U.S. Cl. 292—246 **8 Claims**



A plastic container having a body and a cover and provided with a detachable latch for locking the cover to the body in a closed position. A brace member is provided for reinforcing a shelf formed by a segmental portion of the inner shell of the container body.

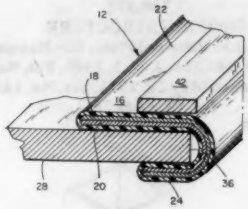
3,730,577

MAGNETO-RESPONSIVE COMPOSITE MOLDING

Victor Shanok, and Jesse P. Shanok, both of Brooklyn, N.Y., assignors to Glass Laboratories Company, Brooklyn, N.Y.

Filed March 17, 1971, Ser. No. 125,195
Int. Cl. E05c *19/16*
U.S. Cl. 292—251.5 **9 Claims**

A magneto-responsive composite molding comprising an elongate casing adapted for operative association with a closure such as a door edge. The casing includes a pair of opposing faces one of which is adapted to contact and be concealed by the a closure or door edge and the other of which is adapted to be exposed relative to the closure or door edge. The composite molding furthermore includes at least one metallic strip which is encapsulated within the casing between the pair of opposing faces of the latter. The metallic strip is constituted of magnetically responsive material for responding to a magnetic force or magnetic forces of a magnetic field provided by a magnetic element mounted in the door frame across which the door edge may be swung.

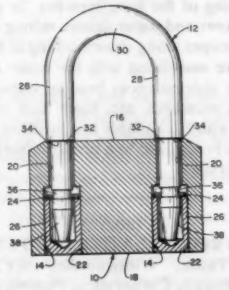


3,730,578

SINGLE ENGAGEMENT PERMANENTLY SECURED KEYLESS LOCK

John R. Gerlach, Monterey Park, Calif., assignor to Emhart Corporation, Bloomfield, Conn.

Continuation-in-part of Ser. No. 185,667, Oct. 1, 1971, abandoned. This application June 29, 1972, Ser. No. 267,517
Int. Cl. E05c *19/18*
U.S. Cl. 292—318 **13 Claims**



A shackle has at least one lower end portion received downwardly in a body opening permanently engaged within the body by a split ring within the body expanding and then contracting into an annular groove of the shackle. The split ring is located within the body by a downwardly closed sleeve press fit upwardly into the body opening from a lower end thereof thereby preventing access to the split ring. An annular shoulder on the shackle locates the shackle within the body for such engagement. The shackle may be U-shaped for reception in two body openings or singular ended for one body opening.

3,730,579

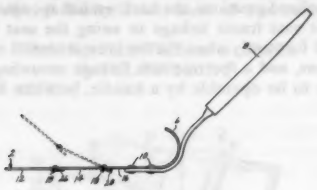
SPATULA

Norman M. Mock, 1934 James Downey Road, Independence, Mo.

Filed July 8, 1971, Ser. No. 160,839
Int. Cl. A47j *43/28*
U.S. Cl. 294—8 **7 Claims**

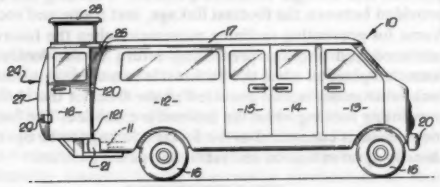
A spatula including a normally planar blade with a handle affixed to one end thereof, said blade being divided transver-

sely into a plurality of sections, each section being pivoted to each contiguous section for upward movement normal to the



plane of the blade, but restrained against downward pivotal movement.

3,730,580
VAN CONVERSION TO CAMPER VEHICLE
John S. Page, Jr., 2842 5th Street, Boulder, Colo.
Filed Aug. 13, 1971, Ser. No. 171,637
Int. Cl. B60p *3/34*
U.S. Cl. 296—23 R **11 Claims**



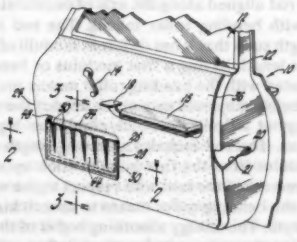
Apparatus to rearwardly extend the interior of a van body having a support frame, a rear door frame and rear doors hinged to the body to open rearwardly away from the door frame, includes:

a. a forwardly opening enclosure including a deck, side walls, rear wall and roof, the enclosure sized to extend directly at the rear of the van body when said doors are opened rearwardly from the door frame, and

b. a lower support for the enclosure located for attachment to rearward extent of the van body support frame.

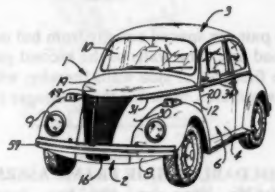
A stove and/or sink may be carried in the enclosure to be accessible from the van body interior, and the enclosure roof may be mounted for optional movement between raised and lowered positions.

3,730,581
VEHICLE POCKET ARRANGEMENT
Charles F. Parkinson, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.
Filed June 28, 1971, Ser. No. 157,382
Int. Cl. B60r *7/04*
U.S. Cl. 296—37 R **2 Claims**



A vehicle pocket arrangement for storing small items includes a downwardly depending flap covered with trim material and integral with a filler board of a vehicle body door trim panel. The flap is defined by a generally U-shaped aperture in the trim panel. A filler board member slightly larger than the depending flap has trim material secured to the lateral and lower edge portions thereof to provide a pocket panel having a generally upwardly opening pocket. The pocket panel is positioned to the rear of the trim panel and then moved upwardly to insert the flap within the pocket. The filler board member is thus located to the rear of the trim panel and overlying the U-shaped aperture. The filler board member is taped to the rear of the trim panel.

3,730,582
VEHICLE MODIFICATION FRONT END PORTION OF AN AUTOMOBILE
Gordon V. Lieffring, Kansas City, Mo., assignor to Lieffring Industries, Incorporated, Kansas City, Mo.
Filed Sept. 13, 1971, Ser. No. 179,812
Int. Cl. B62d *25/08, 65/00*
U.S. Cl. 296—28 R **4 Claims**

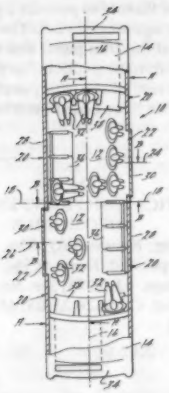


A modification for a front-end portion of a mobile vehicle, such as a 1970 and earlier "Volkswagen," and having a body with at least one door for each side thereof, front fenders, a windshield and a hood extending outwardly and downwardly in an arcuate path from adjacent a lower edge of the windshield wherein the modification includes a side panel for a forward portion of each side of the body and extending forwardly from adjacent the door in the respective side of the body and having a lower edge portion positioned between the body and a respective front fender and a front panel mounted on forward ends of the side panels and a hood member to replace the original hood and extending outwardly and generally horizontally from adjacent the lower edge of the windshield whereby the side panels and the hood member cooperate to enclose a space substantially larger than a space enclosed by the fenders and the original hood. The side panels each have an arcuate trough-shaped portion extending generally upwardly and rearwardly and outwardly from a front end thereof to direct wind upwardly and over and around the mobile vehicle.

3,730,583
PASSENGER COMPARTMENT
Denny D. Colovas; John S. Logan, and Richard R. Skruch, all of Dearborn, Mich., assignors to Ford Motor Company, Dearborn, Mich.
Filed May 21, 1971, Ser. No. 145,681
Int. Cl. B60n *1/00*
U.S. Cl. 296—64 **5 Claims**

An improved passenger compartment for a transportation vehicle having floor and ceiling structures is disclosed. A first pair of side walls are provided which are spaced equally from a first axis passing along the length of the passenger compartment. Each of the first side walls has an extensive and identical opening therethrough. The center of the opening in one of the first side walls is spaced a fixed distance on one side of a second axis passing across the width of the passenger compartment in a directing perpendicular to the first axis. The center

of the opening in the other of the first side walls is spaced the same fixed distance on the other side of the second axis. A second pair of walls are provided for the vehicle. The walls of



the second pair are spaced equally from but on opposite sides of the second axis. The walls of the second pair join opposite ends of the first pair of side walls thereby, with the floor and the ceiling structures, to define the passenger compartment.

3,730,584

FOLDABLE CHAIR FRAME ASSEMBLY

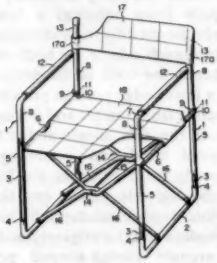
Suekichi Uchida, Niwa-gun, Aichi-ken, Japan, assignor to Uchida Sharyo Co., Ltd., Nagoya-shi, Japan

Filed Jan. 18, 1972, Ser. No. 218,705

Claims priority, application Japan, Jan. 21, 1971, 46/1746

Int. Cl. A47c *4/48*

U.S. Cl. 297—45 **6 Claims**



A foldable chair frame assembly comprising a pair of vertically extendable side frame members and a pair of connection member assemblies connecting said side frame members so as to cause them to approach each other when the chair is folded up and, when one sits on the chair, expanding in the form of the letter X, thereby reinforcing side frame members against the load applied thereon by the sitter.

3,730,585

ROCKER RECLINER CHAIR

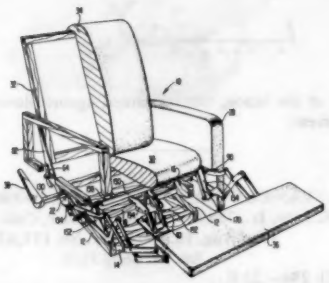
Walter Clark Rogers, Jr., and Frank D. Hoffman, Jr., both of High Point, N.C., assignors to Royal Development Company, Inc., High Point, N.C.

Filed Oct. 19, 1970, Ser. No. 81,957

Int. Cl. A47c *1/02, 3/02*

U.S. Cl. 297—85 **23 Claims**

A rocker-recliner chair having a base, a rocking frame mounted on the base for rocking movement; a seat frame with linkage suspending it from the rocking frame for movement between a lower position and a forwardly raised position; a backrest with linkage connected to the seat frame to pivot relative thereto between a normal upright position and inclined reclined positions, the backrest linkage also serving to actuate the seat frame linkage to swing the seat frame upwardly and forwardly when the backrest is moved into reclining positions, and a footrest with linkage mounting it to the seat frame to be operable by a handle, between a retracted



position and a single extended position. A locking linkage is provided between the footrest linkage, seat frame and rocking frame for preventing reclining movement when the footrest is retracted and also for preventing return of the footrest to retracted position when the backrest is in reclining position. A lock mechanism is also provided at the front of the chair for preventing rocking when the footrest is extended. The locking mechanism is connected to the footrest linkage to be operated thereby upon extension and retraction of the footrest.

3,730,586

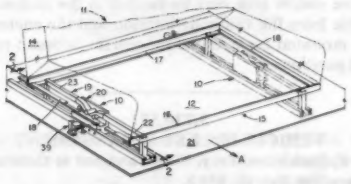
DECELERATING APPARATUS

Walter S. Eggert, Jr., Huntingdon Valley, Pa., assignor to The Budd Company, Philadelphia, Pa.

Filed Nov. 24, 1971, Ser. No. 201,729

Int. Cl. B60r *21/10*

U.S. Cl. 297—216 **4 Claims**

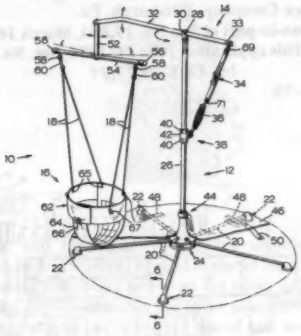


Apparatus for absorbing energy between a seat and a vehicle having a rod aligned along the axis of deceleration which is associated with bending roller means. The rod is deformed along its length such that it has different modulii of bending. A section of its length having a first modulus or bending is normally associated with the bending roller means such that upon the vehicle being subjected to a crash impact the rod absorbs kinetic energy at a first rate which eliminates high frictional starting forces. The rod includes a second length of different bending modulus from the first length which upon continued relative movement of the seat with respect to the vehicle is advanced into the bending roller means to absorb kinetic energy at a second rate. The energy absorbing rod is of the same area in cross-section throughout its length such that either length is capable of absorbing maximum loads in tension upon impact of the vehicle.

3,730,587
EXERCISING APPARATUS FOR SMALL CHILDREN

Samuel Dawson Bloxham, 50 Khartoum Avenue, and Robert Laird Haigh, 3 Bauty Place, both of Scarboro, Ontario, Canada

Filed May 22, 1970, Ser. No. 39,926
Int. Cl. A47b 13/10
U.S. Cl. 297—274 6 Claims

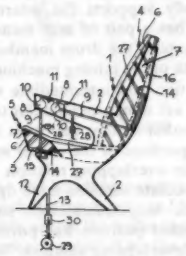


A collapsible and portable device for supporting part of the weight of a child to permit the child to jump up and down and to walk about a central upright column. The device includes a collapsible stand for positioning on a floor and a cantilever and resilient suspension mechanism coupled to the stand such that the mechanism may be rotated about the column. A seat is releasably coupled to the suspension mechanism so that when the child is placed in the seat, a proportion of the child's weight is supported by the device and the child is free to jump up and down and to move in a circle about the column.

3,730,588
SEAT, COUCH OR BED, PROVIDED WITH AT LEAST ONE VACUUM CUSHION

Francois Marie Joseph Braun, Kraainem, Belgium, assignor to Societe anonyme belge d. Exploitation de la Navigation aerienne (Sabena) Brussels, Belgium

Filed June 22, 1971, Ser. No. 155,535
Claims priority, application Belgium, June 23, 1970, 9719
Int. Cl. A47c 27/08, 27/14
U.S. Cl. 297—284 13 Claims

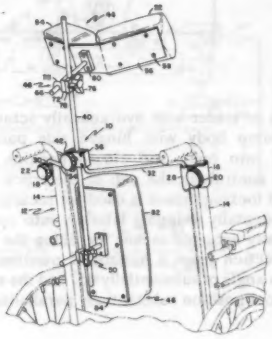


This invention relates to a seat, couch or bed, provided with at least one vacuum cushion comprising an air-tight flexible envelope containing a coherent porous mass or resiliently compressible intercommunicating open cellular material, having an inherent rigidity capable of substantially supporting the weight of an occupant without collapsing , a vacuum source, pipes for connecting the interior of this envelope with said vacuum source and with an ambient environment, at least one valve for selectively opening or for shutting off these communications with the envelope, in order to control the thickness of the cushion independently of the occupant's weight, and for the purpose of directing the compression of the porous mass in the direction of its thickness and facilitating the evacuation of the air contained in the cells of the porous mass when the envelope is in communication with the vacuum source, an additional air-permeable layer which allows, whatever stress is exerted on this additional layer, the circulation of air through same, between the porous layer and the pipe of the valve communicating with the vacuum source, this pipe discharging into this additional layer, said additional layer being provided in the envelop on that face of the porous mass opposite the face on which the occupant's weight is applied.

3,730,589
HEAD OR BACK SUPPORT FOR WHEELCHAIR

Buddy F. Lane, Richmond, Ind., assignor to Avco Corporation, Richmond, Ind.

Filed Dec. 9, 1971, Ser. No. 206,268
Int. Cl. A47c 7/36
U.S. Cl. 297—391 5 Claims

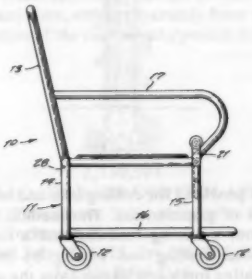


An adjustable head or back support for universal use on wheelchairs is disclosed. The support permits individual adjustment of the head and back supports which can be adjusted to provide for support desired by the individual patient. The horizontal mounting arms are pivotally connected with the coupling bracket so as to automatically compensate for various wheelchair widths. The head and back supports are adjustable in the horizontal, vertical and angular directions to provide the necessary support for the occupant of the wheelchair.

3,730,590
SHOWER CHAIR

Darel E. Harris, 1713 Tyler St., Conway, Ark.

Filed July 28, 1971, Ser. No. 166,742
Int. Cl. A47c 7/00, 7/20
U.S. Cl. 297—445 1 Claim



A chair for supporting an infirmary or metal patient while being showered and dried, the chair consisting of a frame

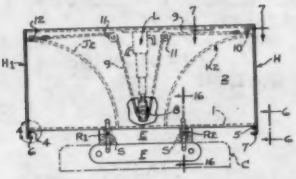
mounted upon rollable casters, the chair back rest having only two narrow slats therein, and the chair including an upwardly pivotable unit so to keep the patient's legs apart during washing and drying operation.

3,730,591

TRUCK OR TRAILER WITH LATERALLY TILTABLE DUMP BODY WITH HINGED SIDE PANELS HYDRAULICALLY OPERATED FROM CLOSED TO OPEN POSITION

Juniper Griffis, Bowie, Tex., assignor to Harold E. Lyst, Bowie, Tex., a part interest

Filed Aug. 24, 1971, Ser. No. 174,372
Int. Cl. B60p *1/28*
U.S. Cl. 298—17.6 **4 Claims**



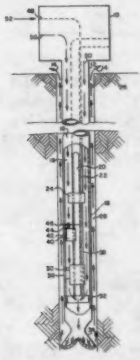
A truck or trailer with hydraulically actuated and laterally tiltable dump body with hinged side panels hydraulically swingable into open and closed position and having the hydraulic controls in the cab of the truck. Novel manually controlled locking means is used for securing the side panels from accidentally swinging laterally into open position. The hydraulically actuated means for tilting the body laterally in either direction from a horizontal position can incline the body at an angle of substantially 45° and the side panels can be swung into a position substantially paralleling the floor of the body.

3,730,592

METHOD OF SUBTERRANEAN DRILLING AND MINING

William Z. Wenneborg, Pocatello, Idaho; Philip R. Bunnelle, Santa Clara, Calif., and Bobby R. Payne, Charleston, W. Va., assignors to FMC Corporation, New York, N.Y.

Filed June 1, 1971, Ser. No. 148,527
Int. Cl. E21c *43/00*
U.S. Cl. 299—17 **9 Claims**



A method is provided for drilling into and mining a subterranean deposit of granular ore. The method incorporates a drilling function, a mining function and a novel change in function between drilling and mining by imposition of a hydraulic actuating force originating from the ground surface. The method is capable of mining a granular ore deposit located in proximity with or below an aquifer without substantially removing water from the aquifer.

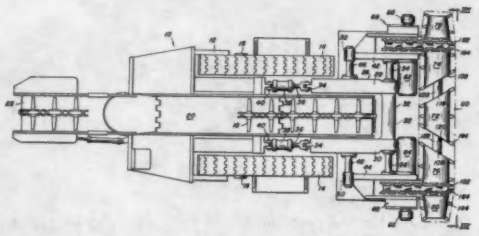
An embodiment of the method permits the change in function between drilling and mining to be repeated as often as necessary to mine several layers of granular ore having intervening layers of overburden.

3,730,593

CONTINUOUS MINING MACHINE

Jerry Karlovsky, Jr., Nashville, Ill., assignor to National Mine Service Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 19,854, March 16, 1970, abandoned. This application June 21, 1971, Ser. No. 155,177
Int. Cl. E21c *27/24*
U.S. Cl. 299—76 **18 Claims**



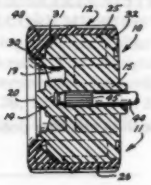
A continuous mining machine has a self-propelled body portion with a conveyor extending longitudinally thereon to transport material dislodged by a forwardly extending drum member toward the rear of the mining machine. A gathering device is positioned below the drum member and has gathering arms to move the dislodged material onto the conveyor. A boom member is pivotally connected to the mining machine body portion and extends forwardly therefrom. A drum member having peripherally extending cutting elements is rotatably secured to the boom member and extends transversely in front of the mining machine. In one embodiment the drum member has a center section, a pair of intermediate sections positioned on the outboard sides of the center section, and a pair of end sections extending outwardly from the intermediate sections. Axial shaft members are secured at one end to the drum member center section and are telescopically positioned in a tubular member secured to the end sections. Another embodiment has a pair of intermediate sections positioned adjacent each other and a pair of end sections extending outwardly from the intermediate sections. An axial shaft member telescopically supports the intermediate sections. The boom member has a pair of arm members arranged to move laterally and extend the drum member to a dimension greater than the width of the mining machine. In one embodiment the center section and intermediate sections have opposed end walls that are nonperpendicular to the longitudinal axis of the drum member so that the drum member in its extended position has portions of the center section and the intermediate sections in overlapping relation. In the other embodiment the intermediate sections have opposed walls nonperpendicular to the longitudinal axis so that the drum member in its extended position has portions of the intermediate sections in overlapping relation. With this arrangement, the cutter elements on the sections of the drum member in an extended position of the drum member dislodge material along the entire length of the extended drum member. A further embodiment of the drum member includes an axial, mating tongue and groove arrangement between the ends of the center section and intermediate sections. The drum member sections in an extended position have the cutter elements on the tongue portions of the center section and intermediate sections in overlapping relation so that the extended drum member dislodges material along its length. A pair of motors are provided to drive the drum member through the telescopic shafting.

3,730,594

WHEEL AND TIRE ASSEMBLY FOR TOY VEHICLES

Theodore H. Zbikowski, Mound, Minn., assignor to Tonka Corporation, Mound, Minn.

Filed April 26, 1971, Ser. No. 137,493
Int. Cl. B60b *5/02*
U.S. Cl. 301—63 PW **4 Claims**



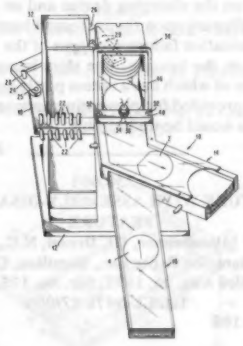
A wheel and tire assembly for toy vehicles wherein a generally cylindrical wheel of rigid material has a reduced portion projecting concentrically from the outer side thereof and a peripheral groove adjacent the inner side thereof and a tire of resilient material encircling the wheel and having an outer side wall tightly encircling the reduced portion and an annular bead on the inner side of the tire seated in said peripheral groove to prohibit outward axial removal of the tire from the wheel.

3,730,595

LINEAR CARRIER SENDER AND RECEIVER

Carl Yakubowski, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 30, 1971, Ser. No. 203,374
Int. Cl. B65g *51/02*
U.S. Cl. 302—2 R **4 Claims**



A wafer transfer and handling apparatus having an indexable carrier for transferring wafers to and from work stations. A wafer on an air slide enters the wafer carrier with the aid of a directional air jet force supplied by the wafer mechanism. A photocell detects a wafer entering the carrier and activates an air cyclinder to move from left to right, thereby permitting an escapement rack to index in a vertical direction. The index rack is adapted for vertical movement, the rack having laterally extending, horizontally disposed, interleaving indexing elements which are spaced apart for cooperation with an escapement pin that slides back and forth across the rack to permit indexing of the rack from one interleaved indexing element to the next. The indexing is repeated until the wafer carrier is full or empty whereupon a limit switch is activated to indicate this to an operator. The carrier is adapted for loading or unloading wafers.

ERRATUM

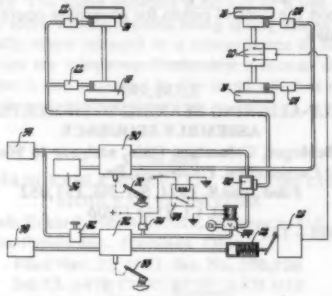
For Class 303—21 F see:
Patent No. 3,730,541

3,730,596

BRAKE CONTROL SYSTEM AND VEHICLE HAVING SAME

Gerardus L. Felix, and Frank C. Bennett, both of London, Ontario, Canada, assignors to General Motors Corporation, Detroit, Mich.

Filed April 21, 1971, Ser. No. 136,089
Int. Cl. B60t *13/74*
U.S. Cl. 303—3 **4 Claims**



A brake control system applied in a preferred embodiment to a heavy hauling vehicle having a combination of four-wheel friction brakes and dynamic brakes acting only on the rear wheels through direct connected electric traction motors. The friction brakes are air operated and may be applied by the vehicle operator at any time. However, the dynamic brakes are intended to be used as the primary braking system and are separately controlled by the vehicle operator by air actuated means of the brake control system. Because actuation of the dynamic brake involves a substantial time delay before effective dynamic braking may be obtained, the brake control is arranged so that upon operation of the dynamic brake pedal by the operator the air operated friction brakes are immediately applied to the front wheels of the vehicle to establish a controllable braking effect which continues for a predetermined period, preferably equal to the time required for effective dynamic braking of the rear wheels to be established. The system permits a full application of the friction brakes on all four wheels at any time, either separately from or in conjunction with utilization of the rear wheel dynamic braking.

3,730,597

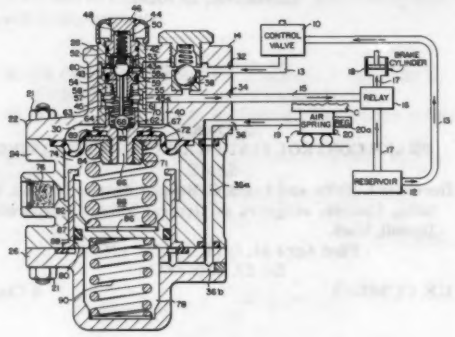
VARIABLE LOAD BRAKE CONTROL APPARATUS

Lynn I. Pickert, Watertown, N.Y., assignor to General Signal Corporation, Rochester, N.Y.

Filed July 16, 1971, Ser. No. 163,229
Int. Cl. B60t *8/18*
U.S. Cl. 303—22 A **7 Claims**

Variable load fluid brake control apparatus is provided for an air spring vehicle having a supply valve for controlling air

pressure to the brakes, a control piston for controlling operation of the supply valve, and a compensating piston biased by



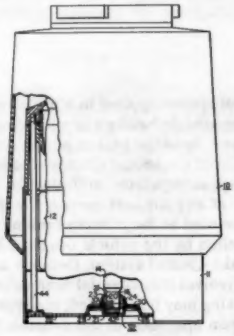
opposing springs and fluid pressure related to the air spring for acting upon the control piston for governing operation of the supply valve.

3,730,598

SELF-ALIGNING BEARING WITH MULTIPLE ASSEMBLY SEQUENCE

Jack E. Bebinger, Columbus, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 8, 1971, Ser. No. 151,052
Int. Cl. F16c *13/06*
U.S. Cl. 308—132 **7 Claims**



The invention provides a self-aligning bearing, shaft and end bell in which the end bell includes a formed, partially spherical bearing surface that takes the angular thrust forces from the shaft. An end cap is rigidly mounted in a formed retaining pocket in the end bell to maintain a lubricating disk for the end of the shaft and the bearing. The assemblage requires only a minimum number of parts and is sufficiently flexible in design to permit an assembly of it by at least two different methods.

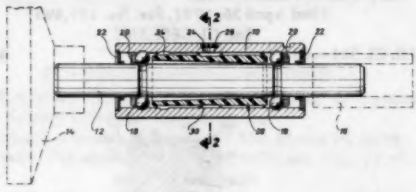
3,730,599

BEARING ASSEMBLY FOR SPINNING ROTORS

Rudolf Fingerle, Esslingen-Zollberg, Germany, assignor to SKF Kugellagerfabriken GmbH, Schwinfurt, Germany

Filed March 30, 1971, Ser. No. 129,365
Claims priority, application Japan, April 2, 1970, 45/31048
Int. Cl. F16c *33/78*
U.S. Cl. 308—187 **12 Claims**

A bearing assembly comprising a hollow cylindrical housing in which a shaft is axially arranged. The shaft and housing are enclosed at each end. A radial opening is provided in the housing forming an inlet port for lubricant. The opening is covered



by an elastomeric sealing member penetrable by a lubricating tool.

3,730,600

COLLAPSIBLE SHIM FOR PRELOADED BEARING AND METHOD OF MAKING SAME

William G. Degnan, Huntington, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed Feb. 9, 1972, Ser. No. 224,739
Int. Cl. F16c *33/00*
U.S. Cl. 308—244 **9 Claims**

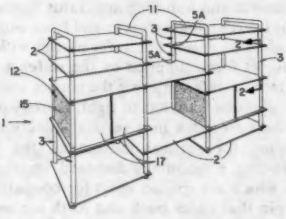
An antifriction bearing capable of being preloaded comprises a plurality of stacked bearing units each including an inner race mounted on a shaft and an outer race supported in a housing and a clamping device which provides retention of the bearing assembly with any desired internal load in the separate bearing units. A resin impregnated fiberglass shim is located between the clamping device and an adjacent bearing race which collapses upon the increased heat and load resulting from a lubrication failure. Collapse of the shim reduces the internal load on the bearing. The shim is supported between two plates, one of which has a recess partly receiving the shim. Means is also provided for preventing outward collapse of the shim when this would be undesirable.

3,730,601

FURNITURE WITH ASSEMBLY-DISASSEMBLY FEATURE

Ernest Luther Misenheimer, III, Drexel, N.C., assignor to U.S. Plywood-Champion Paper Inc., Hamilton, Ohio

Filed Aug. 26, 1971, Ser. No. 175,242
Int. Cl. A47b *87/00*
U.S. Cl. 312—108 **9 Claims**



Furniture is provided with a telescoping joint that secures and spaces shelves and other elements. A stud has a tight fit in

a hole drilled at each corner of a rectangular shelf. A spacer member of tubular shape slips over the stud and extends vertically to the next stud joining to it in a similar telescoping fit. The stud can be of wound paper core material while the spacer may be of plastic pipe. No fasteners are required because of the snug fit between the elements.

3,730,602

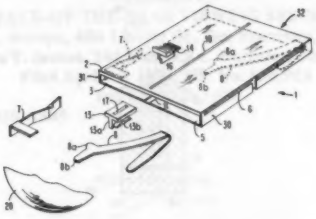
CARTRIDGE PARTICULARLY SUITABLE FOR DISC RECORD MEMBER

Jesse L. Campbell, Lexington, Ky.; Walter F. Klein, and Denis E. Lowry, both of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 20, 1971, Ser. No. 209,667

Int. Cl. A47b *81/00*

U.S. Cl. 312—10 **6 Claims**



The present case is directed to a cartridge suitable for a disc recording member, as an example. In a preferred embodiment, provision is made for feeding discs into the cartridge from the side and ejecting discs from the front of the cartridge. The cartridge has a manual kicker for ejection of discs by the operator. Usually, discs are placed in the cartridge one at a time but facilities are included that enable entry of a plurality of discs through the eject opening by use of an incline member cooperating with a retaining spring.

3,730,603

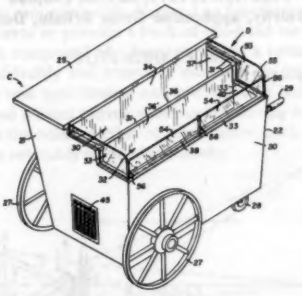
REFRIGERATED DISPLAY CASE FOR FLOWERS AND THE LIKE

Peter Looms, Denver, Colo., assignor to Flowers a la Karte, Inc., Denver, Colo.

Filed March 24, 1971, Ser. No. 127,497

Int. Cl. A47f *3/04*

U.S. Cl. 312—116 **7 Claims**



The invention is an open-top, refrigerated display case which may be mounted on a cart, booth or the like. The display case includes a plurality of elongated bins placed side by side in a stepped array from an upper bin at the rear of the case to a blower bin at the front of the case. The bins are thus advantageously arranged to provide a best possible display of merchandise within them. At the same time, the stepped arrangement permits a slow flow of refrigerated air as from back of the case, from the upper bin, and forwardly into the lower bin with the cool air cascading over merchandise especially within the lower bin.

3,730,604

TELEPHONE STAND

Perfecto Viera, 98-20 62nd Drive, Rego Park, N.Y.

Filed Jan. 26, 1972, Ser. No. 220,853

Int. Cl. H04m *1/04*; A47b *88/04*

U.S. Cl. 312—319 **1 Claim**

The application for patent discloses a telephone stand adapted to support a conventional telephone on a spring pressed tray. The stand provides a drawer or a like member adapted to store writing utensils being spring biased to open automatically when released as a consequence of lifting the receiver from the telephone. Preferably, a second drawer or like member is also provided by the stand which is manually releasable to open position if needed.

3,730,605

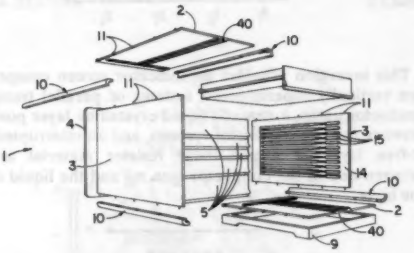
INTERCHANGEABLE SIDE PANEL AND THE LIKE FOR MODULAR FURNITURE

Robert Lewis Eckard, Hickory, N.C., assignor to U.S. Plywood Champion Papers Inc., Hamilton, Ohio

Filed Nov. 22, 1971, Ser. No. 200,930

Int. Cl. A47b *43/00*, *88/00*; A47f *3/14*

U.S. Cl. 312—257 **12 Claims**



Modular furniture has a vertical side panel with a plurality of drawer runners so spaced and designed that drawers of different depths may interchangeably be supported by the panel when incorporated in a cabinet. Further, the panel does not come in right and lefthand members when applied to the outside of a cabinet but instead is interchangeably used on either side of the cabinet.

3,730,606

METHOD FOR FABRICATING A GAS LASER TUBE

Karl Gerhard Hernqvist, Princeton, and Donald Chester Pultorak, Trenton, both of N.J., assignors to RCA Corporation, New York, N.Y.

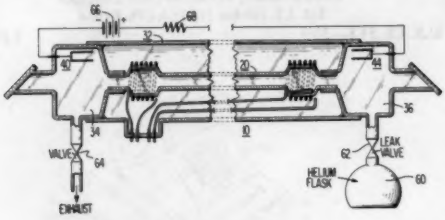
Filed May 8, 1970, Ser. No. 35,691

Int. Cl. H01j *9/18*

U.S. Cl. 316—19 **4 Claims**

The process of manufacturing a vapor-type gas laser tube, such as a He-Cd or He-Zn for example, is considerably simplified by inserting the active material to be vaporized within the evaporator before the tube is put together. This means that baking of the tube, after it is put together, must be done at a

lower temperature than is usual in order to avoid evaporation of the active material during baking. However, flushing the tube cavity with an inert gas, such as helium, after baking at



this lower temperature, results in the removal of unwanted residual impurities being just as great as conventional baking at higher temperature.

3,730,607

INDICATOR SCREEN WITH CONTROLLED VOLTAGE TO MATRIX CROSSPOINTS THEREOF

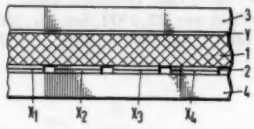
Josef Grabmaier, Unterhaching; Hans Krueger, Munich, and Ulrich Wolff, Munich, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed July 12, 1971, Ser. No. 161,776

Claims priority, application Germany, July 23, 1970, P 20 36 665.8

Int. Cl. G02f 1/34

U.S. Cl. 350—160 LC **6 Claims**



This invention provides an indicator screen comprised of two vertically superimposed systems of parallel transparent conductor paths, a nematic liquid crystalline layer positioned between the two conductor systems, and an interrupted barrier-free layer of a non-linear resistor material arranged between one of the conductor systems and the liquid crystalline layer.

3,730,608

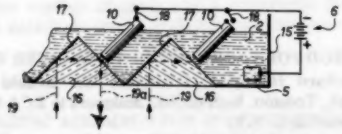
ELECTROLYTIC LIGHT MODULATION SYSTEMS

Adrien Castegnier, 10,050 Place Guillaume, Chambon, Quebec, Canada

Filed Sept. 30, 1971, Ser. No. 185,176

Int. Cl. G02f 1/34

U.S. Cl. 350—160 R **14 Claims**



Systems to modulate beams of light, including monochromatic and laser beams, by the use of an electrolyte chemically constituted to generate a gas medium against an electrode, thereby forming mediums having a different index of refraction than the electrolyte and thence producing reflecting interfaces between either the electrolyte and the gas mediums, or preferably between one prism and one or more associated gas mediums. A system wherein a screen is formed of prisms, an appropriate electrolyte and electrodes which are selectively and sequentially electrically energized and swept to reproduce an image on the screen.

3,730,609

THERMALLY COMPENSATED ULTRASONIC LIGHT MODULATOR

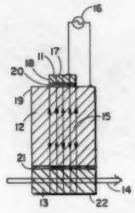
Kouichi Minemura, Tokyo, Japan, assignor to Nippon Electric Company, Limited, Tokyo, Japan

Filed Feb. 28, 1972, Ser. No. 229,814

Claims priority, application Japan, March 10, 1971, 46/13212

Int. Cl. G02f 1/28; H01s 3/00

U.S. Cl. 350—161 **2 Claims**



An ultrasonic light modulator includes a transducer for generating an ultrasonic wave, a medium through which the wave generated by the transducer is propagated, an acoustooptical effect member attached to the medium, and a means for directing a light beam onto the member. The transducer, medium, and member are selected so that one has a temperature coefficient of resonant frequency different from the other two. The lengths of the transducer, medium, and member measured in the direction of the ultrasonic resonance are selected so that the overall temperature coefficient of the modulator is substantially zero.

3,730,610

DIRECTION-SENSITIVE PROJECTION SYSTEMS FOR LIGHT-DIFFRACTION GRATINGS

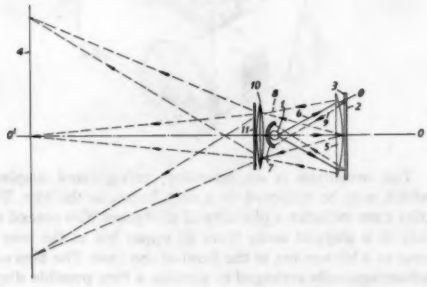
Paul Hans Lissberger, Altringham, England, assignor to Plessey Handel Und Investments A.G., Zug, Switzerland

Filed Nov. 5, 1971, Ser. No. 196,068

Claims priority, application Great Britain, Dec. 24, 1970, 61,346/70

Int. Cl. G02b 27/38

U.S. Cl. 350—162 SF **6 Claims**



To produce on a screen an image of a diffraction grating pattern provided on a surface in which grating portions extending in one direction are represented bright and grating

portions extending at right angles thereto are represented dark, the grating pattern is illuminated by a tubular lamp extending in the direction of the first mentioned grating portions through an autocollimator lens, the direct-reflected rays being intercepted by a lamp shield while the light diffracted by grating portions extending in the first-mentioned direction bypasses the shield to reach a projection lens to form a projected image on the screen, a lens mask being provided which intercepts light deflected in the longitudinal direction of the lamp.

3,730,611

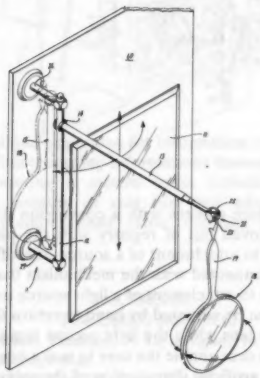
Patent Not Issued For This Number

3,730,612

BACK-OF-THE-HEAD VIEWING SYSTEM

Norma Z. Arroyo, 400 Liberty St., San Francisco, Calif., and Norman T. Seaton, 240 Tunnel Rd., Berkeley, Calif.

Filed April 19, 1971, Ser. No. 134,954
Int. Cl. G02b *5/08*
U.S. Cl. 350—305 **3 Claims**



A mirror mounting unit designed to function along side an existing mirror to provide a back-of-the-head viewing system. The unit is composed of a bracket having a vertical bar upon which is slideably and rotatably mounted an extendible arm having on one end thereof one portion of a ball and socket retainer and a hand mirror with handle, having on one end of the handle the other portion of the retainer, such that the mirror may be rotatably suspended thereby.

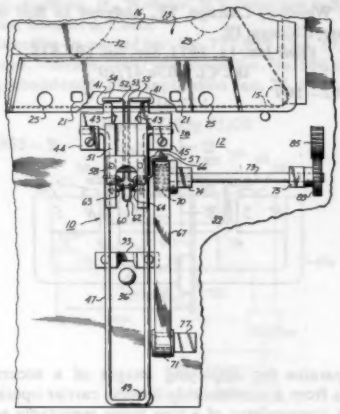
3,730,613

INFORMATION RECORDING AND REPLAY METHODS AND APPARATUS

Joseph J. Neff, Pasadena, Calif., assignor to Bell & Howell Company, Chicago, Ill.

Filed Nov. 16, 1970, Ser. No. 89,995
Int. Cl. B65h *17/00*; G03b *1/18*
U.S. Cl. 352—72 **50 Claims**

Methods and apparatus for performing a function (such as recording or playback) relative to an elongate information carrier located in a casing include the provision of a capstan at a distance from the casing and an extraction of a length of the information carrier out of the casing in a direction away from the casing by finger means. A portion of the extracted information carrier is placed onto the capstan with the finger



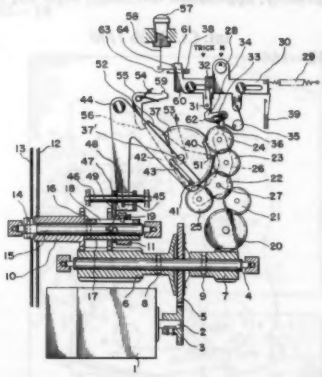
means and the capstan is employed to advance the information carrier. The desired function is then performed relative to the information carrier.

3,730,614

AN OVERLAP CONTROL DEVICE FOR A MOTION PICTURE CAMERA

Hiroshi Hirata, Sakai-shi, Osaka-fu, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed July 23, 1970, Ser. No. 57,537
Claims priority, application Japan, July 31, 1969, 44/60013
Int. Cl. G03b *21/36*
U.S. Cl. 352—91 **2 Claims**

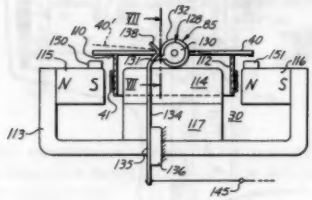


An overlap photographic control device uses a manually operated change-over member to effect either normal or overlap photographic operation in accordance with the position of the change-over member. A switch operated by the change-over member drives the camera motor in a reverse direction to rewind the film and the switch is retained by a lock member until a clutch, associated with the change-over member, drives a control gear to close the aperture. After the shutter is driven to a position to block light rays the control gear is disengaged from the clutch and the sector gear actuates the switch lock member to enable the switch to change the direction of the motor. The change-over operation member is released and allowed to return to its normal photographic position. Automatic control of fade in and fade out photography is thereby obtained.

3,730,615
IMAGE DISPLAY FROM CONTINUOUSLY MOVING IMAGE CARRIER

James G. Woodier, Chicago, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Jan. 11, 1971, Ser. No. 105,515
Int. Cl. G03b 41/10
U.S. Cl. 352—109 8 Claims

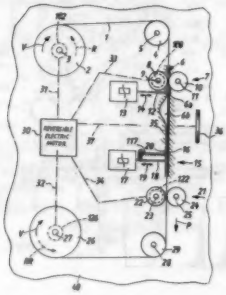


An apparatus for displaying images of a succession of recordings from a continuously moving carrier operates with an optical compensator of a type being repeatedly advanced and being reset between successive advancements. Each image is displayed by the way of the compensator and the compensator is advanced during the display of each image to compensate for the continuous carrier movement and for sensed movements in the projected images. Resetting of the compensator is initiated by an electrical signal generating device which is coupled to the compensator drive for providing a reset signal upon attainment by the compensator of the predetermined state of advancement.

3,730,616
CINEMATOGRAPHIC APPARATUS

Engelbert Fliesser, Munich, Germany, assignor to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Sept. 23, 1971, Ser. No. 182,980
Claims priority, application Germany, Sept. 25, 1970, P 20 47 351.2
Int. Cl. G03b 1/00
U.S. Cl. 352—166 16 Claims

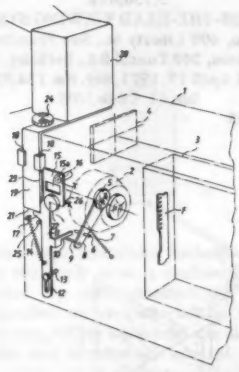


A motion picture projector wherein the supply and takeup reels are rotatable in either direction by way of friction clutches and wherein the film is moved stepwise past the gate by two transporting devices which employ friction wheels and pressing rollers serving to bias the film against the respective friction wheels. The friction wheels are driven by way of friction clutches from a separate motor or from the motor which serves to drive the supply and takeup reels. An electromagnetically operated arresting device is located between the gate and one of the transporting devices to hold the film against lengthwise movement by the one transporting device when the other transporting device is free to move the film past the gate, and an electromagnetically operated blocking device is mounted between the gate and the other transporting device to hold the film against movement past the gate when the image of a film frame is being projected and while the arresting device is inoperative to thus permit the film to form a loop upstream of the gate.

3,730,617
MOTION PICTURE CAMERA FOR USE IN DAYLIGHT AND ARTIFICIAL LIGHT

Siegfried Werz, Munich, and Johann Zanner, Unterhaching, both of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 25, 1971, Ser. No. 174,639
Claims priority, application Germany, Aug. 27, 1970, G 70 31 983.4
Int. Cl. G03b 11/00
U.S. Cl. 352—244 13 Claims

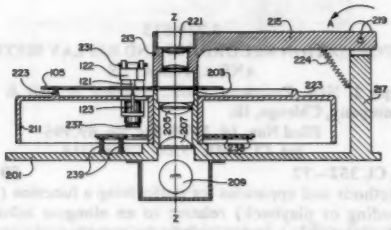


A motion picture camera with a conversion filter which is automatically moved out of registry with the picture taking lens in response to attachment of a source of artificial light. A knob which is connected with the mechanism that moves the filter in response to attachment of a light source to the housing of the camera can be actuated by hand to return the filter into registry with the lens while the light source remains attached to the housing to thus enable the user to make one or more exposures without artificial illumination of the subject while the source remains attached to the housing. The knob can also return the filter to a position out of registry with the lens while the light source remains attached to the housing.

3,730,618
AUDIO AND AUDIOVISUAL APPARATUS WITH PINCERS-LIKE ROTATING ARM

Panayotis C. Dimitracopoulos, P. O. Box 458, Outremont, Montreal, Quebec, Canada

Filed March 2, 1970, Ser. No. 15,739
Int. Cl. G11b 17/06; G03b 31/06
U.S. Cl. 353—19 26 Claims



An audio apparatus comprising a rotating information-scanning arm, having the general shape of a two-pronged

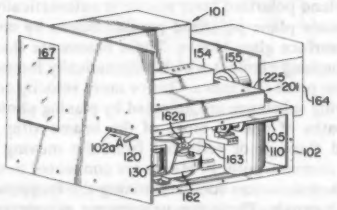
yoke, which straddles and grips, in pincers-like fashion, both sides of a sound and information record, one of its gripping elements including a sound and signal reading transducer. An audiovisual embodiment of the above being an apparatus for the simultaneous, synchronized, optical projection of an image and the reproduction of its associated sound from audiovisual slides and audiovisual data-record cards having a projectable image surrounded by a spiral information track, in which case, the transducer-carrying two-pronged yoke, rotates around the optical projection beam.

3,730,619

APPARATUS FOR INFORMATION RETRIEVAL

Sakae Fujimoto, Chofu-shi, Tokyo, Japan, assignor to Kabushiki Kaisha Ricoh, Tokyo, Japan

Filed Feb. 17, 1970, Ser. No. 12,089
Claims priority, application Japan, Feb. 20, 1969, 44/12843
Int. Cl. G03b *23/12, 21/28*
U.S. Cl. 353—26 **8 Claims**



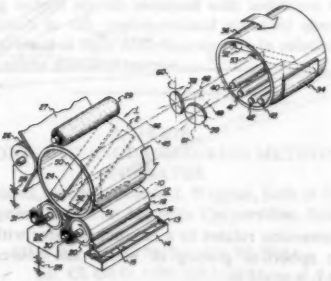
A method and apparatus for information retrieval wherein an endless film recording informations thereupon is advanced and the counting is started upon detection of the zero (reference) position of said film and when the counting reaches a predetermined value, the film is automatically stopped.

3,730,620

FOCUSING METHOD

Earl V. Jackson, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 29, 1970, Ser. No. 102,460
Int. Cl. G03g *15/04*
U.S. Cl. 355—8 **3 Claims**



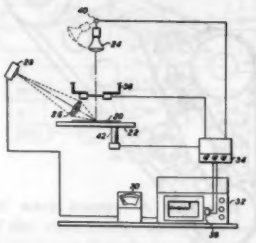
A method for presenting focused images at a predetermined magnification in an optical system having narrow format and fixed object and image planes. The lens with a nominal focal length suitable for the system is manipulated according to the invention by rotating it to change the total conjugate of the optical system while maintaining a fixed physical distance along the principal ray of the imaging system between the object and image planes.

3,730,621

CONTROL OF ELECTROSTATIC DEFORMATION OF THERMOPLASTIC FILM

William A. Sullivan, Jr., Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 777,959, Oct. 17, 1968, abandoned, which is a continuation of Ser. No. 506,646, Nov. 8, 1965, abandoned. This application Jan. 27, 1971, Ser. No. 110,214
Int. Cl. G03g *15/00*
U.S. Cl. 355—9 **6 Claims**



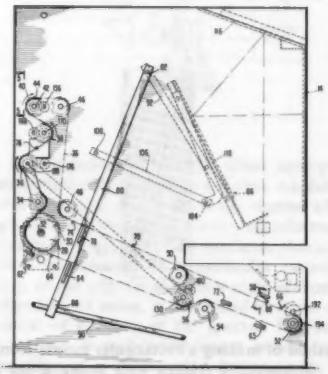
Apparatus for producing images by electrostatic deformation has a light source for both exposing the deformable member to an image and heating the deformable member to the point where it is deformed by the electrostatic charges. A photocell receives rays passing from the light source through the deformable member or reflected from the deformable member and generates an electrical signal to terminate the heating of the film at the appropriate time.

3,730,622

MICROFILM VIEWER-PRINTER

Lawrence M. Freeman, and Francis T. Arnold, both of Atlanta, Ga., assignors to Micro Information Systems, Inc., Atlanta, Ga.

Filed May 24, 1971, Ser. No. 146,114
Int. Cl. G03b *27/70*
U.S. Cl. 355—14 **34 Claims**



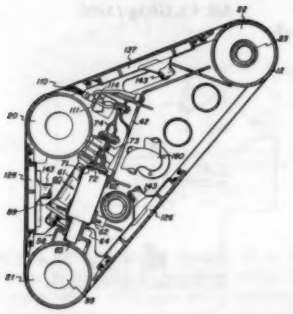
In a viewer-printer, a chain is provided which is driven by the motor's sprocket wheel. The chain drives other sprocket wheels in the viewer printer to effectuate feeding and delivery of the copy paper. Along a portion of the chain, normally a single chain, is a dual link chain constituting two such chains integrally mounted together. The additional portion drives rollers which feed paper about to be copied. Cams are provided along the chain to throw switches. The placement of the switches along the chain control the machines timing. A lug on the chain engages the mirror to move it from a viewing position to an exposing position and returning to the viewing position.

3,730,623

VACUUM HOLDDOWN DEVICE FOR MOVING BELTS

William E. Jordan, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 29, 1970, Ser. No. 102,312
Int. Cl. G03g 15/00
U.S. Cl. 355—16 1 Claim



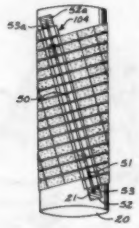
A vacuum holddown device for use in an apparatus employing flexible web material in a flattened condition. A perforated plenum plate is joined to a manifold connectable to a vacuum producing means. A plurality of ribs are formed on the plate between it and the manifold. When the space between the plenum plate and manifold is evacuated the latter is forced against the ribs.

3,730,624

METHOD OF MAKING A MATRIX OF PHOTOGRAPHS FROM A FILM STRIP

Julian Silver, White Plains, N.Y., assignor to U. S. Dynamics Inc., Elmsford, N.Y.

Filed April 26, 1971, Ser. No. 137,270
Int. Cl. G03b 27/02
U.S. Cl. 355—132 18 Claims



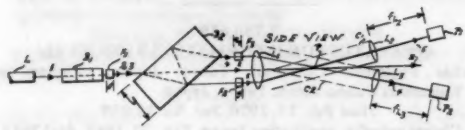
A method of making a rectangular matrix from a film strip having photographic frames with image areas includes the steps of exposing a series of image areas on frames of a film strip, leaving blank frames at predetermined locations on the film strip, processing the film strip to produce image transparencies thereon, winding the film strip around a cylinder to form adjacent convolutions with the blank areas aligned, securing the blank areas together, and cutting the film strip on the cylinder through all of the blank areas at an angle approximately of 90° with respect to the longitudinal axis of the film strip thereby to produce a rectangular matrix of photographic frames with image areas thereon, termed as a fiche. The resulting matrix, plus an indicia bearing document, may be photographed to produce a photographic transparency or fiche copy.

3,730,625

LASER VELOCIMETER EMPLOYING REFERENCE BEAM DETECTION

Donald B. Brayton, Tullahoma, Tenn., assignor to The United States of America as represented by the Air Force

Filed Feb. 26, 1971, Ser. No. 119,322
Int. Cl. G01p 3/36
U.S. Cl. 356—28 3 Claims



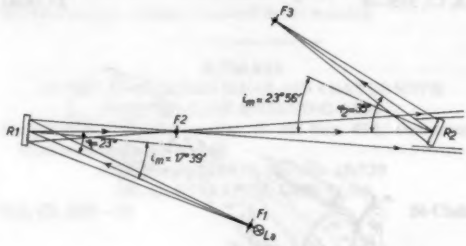
A doppler shift laser velocimeter is disclosed that employs a self-aligning optical system capable of determining one or more velocity components of a moving substance. The beam from a plane polarized laser source is automatically split into two or more plane polarized parallel beams by one or more parallel surface glass blocks. These beams are then directed onto a focusing element which automatically focuses them to a common point P in space. One or more velocity components of a moving substance are detected by placing photodetectors in the paths of one or more of the beams after they have traversed through or reflected from the moving substance near the common point P. Means are connected to the outputs of the photodetectors for determining the frequencies of the electrical signals. These frequencies are proportional to the specific velocity components of the moving substance.

3,730,626

MONOCHROMATORS WITH CONCAVE SPHERICAL GRATINGS

Paul E. Cruvellier, Marseille, and Michel Duban, Gemenos, both of France, assignors to Centre National d'Etudes Spatiales, Paris, France

Filed Feb. 11, 1972, Ser. No. 225,501
Claims priority, application France, Feb. 11, 1971, 04612
Int. Cl. G01j 3/12; G01n 21/34
U.S. Cl. 356—101 5 Claims



This invention relates to a monochromator with a rotating concave spherical grating in which the source-to-grating distance L is equal to

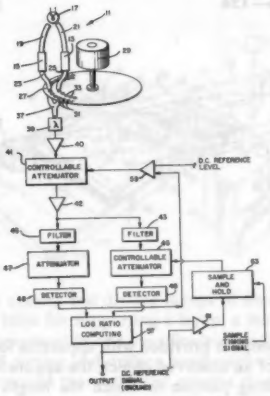
$$[2R \sin \phi \cos i_m]/2 \sin \phi - (k\phi_m/a)\cos r_m]$$

Where ϕ is the angle of deviation of the beam, R is the radius of curvature of the grating, λ_m is the mean working wavelength, i_m and r_m are the angles of incidence and of diffraction for λ_m, a is the pitch of the grating and k is the order of the operative procedure, the angle ϕ being less than 40° but at least equal to $k\lambda_m/a$. The monochromators can be used for studying photomultipliers.

3,730,627
SIGNAL PROCESSOR

Robert L. Kent, Andover, Mass., assignor to Damon Corporation, Needham Heights, Mass.

Filed Sept. 22, 1971, Ser. No. 182,785
Int. Cl. G01n 21/22
U.S. Cl. 356—205 6 Claims



The absorbance measuring signal processor disclosed herein operates to generate a signal representing the absorbance of an unknown sample in relation to the absorbance of a previously measured standard sample. In measuring the absorbance of each sample, standard or unknown, the apparatus generates a signal corresponding to the log ratio of two signals, representing, respectively, the optical transmission of the sample channel and the optical transmission of a reference channel. The use of the ratio of the two transmission characteristics compensates for source and detector sensitivity variations while the logarithmic characteristic provides a signal which corresponds with the absorption characteristic.

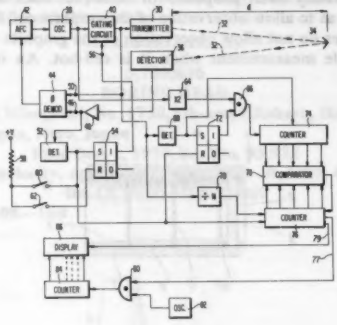
In accordance with the invention, a controlled attenuation factor is applied to one of the transmission signals and this attenuation factor is adjusted, during measurement of the standard sample, so as to produce an absorbance output signal of predetermined level. A signal level representing this particular attenuation factor is sampled and stored and this same attenuation factor is then applied during the measurement of subsequent unknown samples. Accordingly, the absorbance-representing output signals obtained with unknown samples vary in relation to the predetermined standard absorbance output signal level as their absorbances vary in relation to the absorbance of the standard sample.

3,730,628
ELECTRONIC DISTANCE MEASURING METHOD AND APPARATUS

John R. Wolcott, and MacDonald J. Wiggins, both of Orlando, Fla., assignors to Martin Marietta Corporation, New York, N.Y.

Filed Dec. 16, 1970, Ser. No. 98,778
Int. Cl. G01c 3/08; G01s 9/23
U.S. Cl. 356—5 25 Claims

An electronic distance measuring device and method for determining the distance between two locations utilizing electromagnetic or light wave energy. The wave energy is transmitted from one location to the other and is reflected back toward the transmitting location. The reflected energy is detected and compared in phase with the transmitted energy, and the phase relationship between the transmitted and detected energy varied until a predetermined phase relationship exists. The predetermined phase relationship is selected so that the wave energy along the path between the transmitter, reflector and detector contains an integral number of

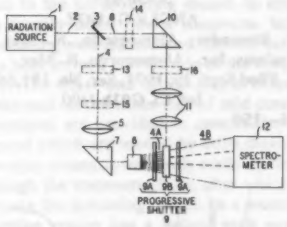


wavelengths of wave energy. A time gate related to the propagation of the wave energy along this path is generated and distance is displayed digitally in response to the time gate and a highly stable reference frequency signal.

3,730,629
TIME RESOLVED SPECTROMETER

Peter Michael Rentzepis, Millington, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 24, 1970, Ser. No. 101,208
Int. Cl. G01j 3/02, 3/42
U.S. Cl. 356—74 6 Claims



Apparatus arrangements for yielding either absorption or emission spectral data with superimposed time resolution are described. Such apparatus may serve in the manner of any of the various spectrometer designs and may yield information of the variety, bandwidth, accuracy and precision characterized by conventional instruments. In a particular embodiment, time resolution, which may range over a scale of from a few hundred picoseconds or more, is evidenced in terms of relative displacement of portions of the spectra. Displacement proportional to time in such embodiment results from the progressive opening of a electrooptic shutter under the influence of a traveling light pulse.

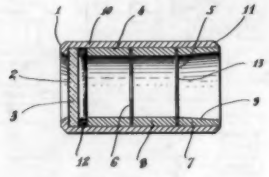
3,730,630
OBSERVING DEVICE FOR HEATED SAMPLE CELLS

Wolfgang Witte, 777 Ueberlingen, Germany, assignor to Bodenseewerk Perkin-Elmer & Co., GmbH, Bodensee, Germany

Filed Dec. 21, 1970, Ser. No. 100,170
Int. Cl. G01j 3/02
U.S. Cl. 356—74 3 Claims

An opening in the housing surrounding a graphite tube sample cell of the type used for heating an atomic absorption sam-

ple may be used for introducing the sample and later (when the graphite cell is heated during sample measurement) must be closed to avoid escaping of the non-oxidizing gas introduced within the housing for protection of the graphite cell. It has already been proposed to construct such a closing device so as to allow observation of the graphite cell but existing devices do not allow observation of the graphite cell during sample measurement when it is red-hot. An improved



combined observing and closure device utilizing the known principles of a pin-hole camera includes an apertured stop (preferably a field stop) and a ground-glass screen for receiving the image, all in a supporting tubular member which may be utilized as the closure. Preferably the parts of the device nearest the graphite tube cell (e.g., one surface of the aperture stop and its supporting structure) are made specularly reflecting.

3,730,631

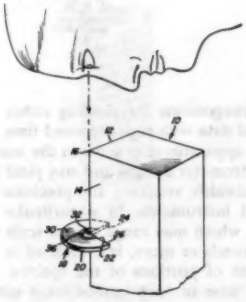
ANGLE GAUGE

George W. Streander, Alamogordo, N. Mex., assignor to Design Systems, Inc., Alamogordo, N. Mex.

Filed Sept. 20, 1971, Ser. No. 181,861

Int. Cl. G01b *1/00*

U.S. Cl. 356—150 **6 Claims**



A corner angle testing body including a panel member having a notch formed therein defined by a pair of relatively angulated plane surfaces defining a desired included angle therebetween. The panel member further includes an enlargement of the apex portion of the notch adjacent and extending about the point of intersection of the plane surfaces defining the notch and one side of the panel member is provided with a plane partial annular light-reflective surface extending about and concentric with the point of intersection of the plane surfaces defining the notch and the light-reflective surface is disposed normal to the notch-defining plane surfaces or edges.

3,730,632

ENDOSCOPE PROVIDING AN IMAGE OF AN OBSERVED OBJECT AND A SCALE BY WHICH THE TRUE SIZE OF THE OBJECT CAN BE DETERMINED FROM THE IMAGE

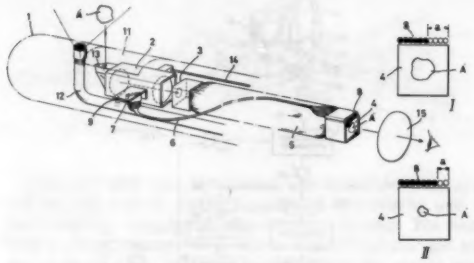
Toshio Chikama, Tokyo, Japan, assignor to Kabushiki Kaisha Machida Seisakusho, Tokyo, Japan

Filed June 25, 1971, Ser. No. 156,701

Claims priority, application Japan, June 26, 1970, 45/55190

Int. Cl. G01b *11/00*

U.S. Cl. 356—156 **10 Claims**



An endoscope is provided with apparatus for indicating the actual size of an observed object, the apparatus comprising a scale indicating portion in which the length of a bright or shaded portion is varied by movement of a shading plate in correspondence with relative movement effected between an object lens housing and an image conducting member to form a sharp image on an image viewing surface of the image conducting member. The indicating portion is adjacent the image viewing surface and the length of the bright or shaded portion represents a predetermined dimension, e.g. 10 mm and by comparing the size of the actual image of the object to the length of the bright or shaded portion, the actual size of the object can be determined.

3,730,633

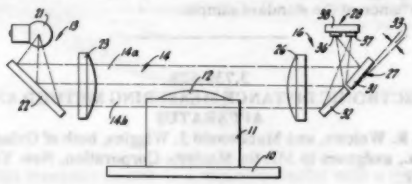
PHOTOMETRIC DETECTOR AND MEASURING SYSTEM

William S. Kennedy, San Jose, Calif., assignor to Aerotherm Corporation, Mountain View, Calif.

Filed Dec. 31, 1970, Ser. No. 103,065

Int. Cl. G01b *11/00*

U.S. Cl. 356—156 **1 Claim**



Photometric system in which a portion of a columnized beam of light is interrupted by objects in a predetermined region, while another portion of the beam passes uninterrupted to a receiving station. The two portions of the beam are separated at the receiving station, and their intensities are compared to determine the presence of objects and the extent to which they are present in the region.

3,730,634

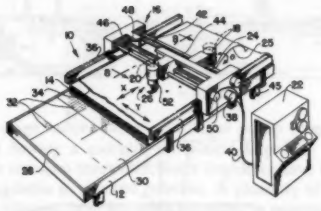
APPARATUS FOR CUTTING AND DRILLING SHEET MATERIAL

Heinz Joseph Gerber, and David R. Pearl, both of West Hartford, Conn., assignors to Gerber Garment Technology, Inc., East Hartford, Conn.

Continuation-in-part of Ser. No. 1,412, Jan. 8, 1970,. This application Nov. 27, 1970, Ser. No. 92,983

Int. Cl. 408 *88;* **B27c** *9/00*

U.S. Cl. 408—22 **17 Claims**



Apparatus for cutting and drilling layups of sheet material and including a table for supporting a layup, a main carriage supported for movement in one coordinate direction relative to the table, and cutting and drilling heads supported on the carriage for movement therewith and relative thereto and to each other in at least one other coordinate direction. The main carriage and the cutting and drilling heads move in response to positioning signals supplied by a numerically controlled or computerized controller. A movable cutting tool or blade driven by the cutting head is adapted to advance in cutting engagement with the layup to form a cut therein. A trepanning or drilling tool carried by the drilling head removes material from the layup at selected points to form openings therethrough. The shape of the drilling tool is such that the drilling operation is performed with a minimum of applied pressure, so that substantially no compressive force is applied to the layup by the drilling tool to cause movement of upper layers of the layup relative to the cutting tool.

3,730,635

DRILL PRESS

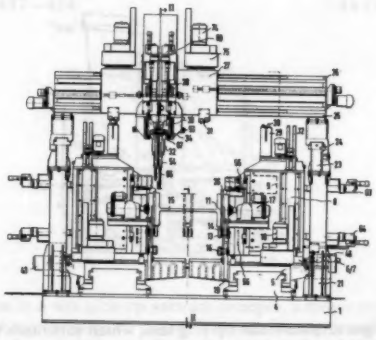
Roderich Orendi, Rosnetstrasse 50, Reutlingen-Sondelfingen, Germany

Filed Oct. 2, 1970, Ser. No. 77,661

Claims priority, application Japan, Oct. 6, 1969, 44/79912

Int. Cl. B23b *39/18, 41/00*

U.S. Cl. 408—46 **6 Claims**



The drilling of holes in three different planes and thus into three different surfaces of a workpiece, especially extra heavy workpieces, is accomplished by the present numerically controlled drill press by means of mirror-symmetrical housings each carrying a rotational set of horizontal boring quills and long chuck jaws facing each other as well as an overhead vertical set of boring quills. The drill bits of the horizontal boring quills extend in their operational position through said long chuck jaws, whereby even I-beams may be drilled through three surfaces simultaneously.

3,730,636

BORING HEAD

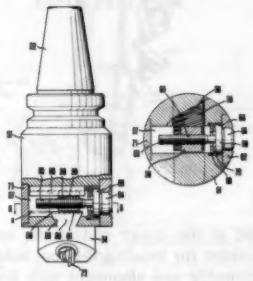
Sutemaru Mizoguchi, No. 1738, Oh-aza, Kitahara, Ikoma-cho, Ikoma-gun, Nara, Japan

Filed Dec. 1, 1970, Ser. No. 93,932

Claims priority, application Japan, Dec. 10, 1969, 44/99618

Int. Cl. B23b *43/00, 51/00*

U.S. Cl. 408—169 **1 Claim**



A boring head has a boring head body having a shank on the upper part thereof, and bit mounting means is slidably fitted into a transverse channel formed on the underside of the body. A bit is secured to the bit mounting means. In one embodiment a bolt is loosely fitted into a transverse hole formed through the mounting means, one end thereof being loosely fitted through a hole formed on one side of the concave channel of the body. The other end of the bolt is screwed into a threaded hole formed on the other side of said concave channel. Wedge members are provided in concavities above the transverse channel which are moved by bolts therethrough to wedge the mounting means downwardly while it is loosely held by the bolt through the transverse hole, after which the bolt s tightened to secure the mounting means. In a second embodiment the mounting means has a helical rack gear thereon meshing with a sliding member in a transverse hole above the transverse channel, and a bolt threaded through the sliding member moves the sliding member when the bolt is rotated, thereby moving the mounting means.

3,730,637

TOOL HOLDER LOCKING DEVICE FOR ROTATING SPINDLES

Vito Cellini, 281 Brinsmade Ave., Bronx, N.Y.

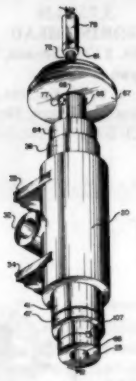
Filed Oct. 30, 1970, Ser. No. 85,439

Int. Cl. B23b *39/00*

U.S. Cl. 408—239 **9 Claims**

A locking device for releasably securing a work tool holder to a rotating spindle. This locking device is centrally mounted within the rotating spindle to rotate therewith and includes a bushing with a lock shank extending downwardly with radially extending projection adapted to engage with projections on the inner end of the tool holder. Cam slot means are provided upon the lock member to effect a turning of the lock member for engagement of the projections of the lock member with the projections of the tool holder, an operating rod extends upwardly from the lock member within the spindle and spring biasing means urging the upward movement of the operating member, the operating member is confined against rotation while being depressed and has pin projections entering the

dog-leg slots of the lock member so that as the rod is depressed the lock member will be rotated to engage the lock projections with or disengage them from the tool holder. The rotating spindle is carried in a spindle support which is in turn supported upon an arbor arm of a drill press. The tool holders are easily released by a mere use of a tool for depressing the



operating rod at the upper end of the spindle. Centering means is provided for locating the tool holder in the proper angular relationship and alignment with the locking projections of the locking member. The spindles and the lock devices are self contained and can be mounted singularly or in multiple numbers in a supporting frame.

3,730,638

SPEED GOVERNOR

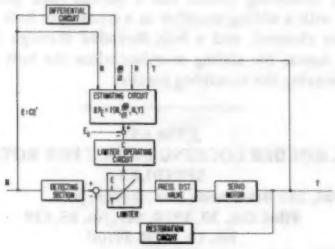
Takao Kuwabara, Hitachi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 16, 1971, Ser. No. 208,795

Claims priority, application Japan, Dec. 16, 1970, 45/111751

Int. Cl. F03b *3/06*

U.S. Cl. 415—24 **11 Claims**



A speed governor system for a hydraulic or pumper turbine being fed water from a penstock for controlling the output of the turbine under varying load conditions. When the load of a generator coupled to the turbine is abruptly cut off, the governor system closes the guide vane assembly to limit the flow of water to the turbine at a speed in accordance with an estimated water pressure rise in the penstock. The water pressure rise is estimated from the operational turbine factors including rotational frequency of the turbine runner, the acceleration thereof, the water head and the position of the guide vane assembly. The governor system acts to prevent a dangerous level of water pressure rise.

3,730,639

FAN OR COMPRESSOR FOR A GAS TURBINE ENGINE

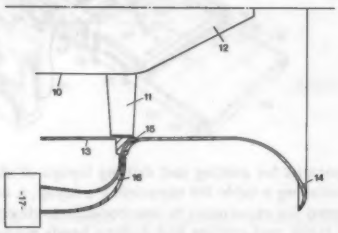
Christopher John Moore, Mickleover, and Brian Barry, Duffield, both of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed July 16, 1971, Ser. No. 163,210

Claims priority, application Great Britain, July 17, 1970, 34,728/70

Int. Cl. F01d *25/04*; **F04d** *29/66*, *29/68*

U.S. Cl. 415—119 **3 Claims**



The noise generated by a fan is to be largely due to the blade tips passing the turbulent boundary layer which is attached to the duct wall.

The present invention provides a slot positioned immediately upstream of the fan, the slot being connected to a duct and means for providing suction in the duct so that the boundary layer is removed and the blade tips pass substantially laminar flow.

3,730,640

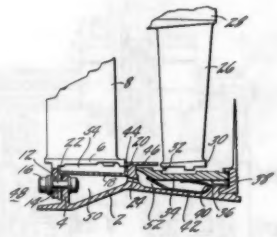
SEAL RING FOR GAS TURBINE

Alvin S. Rice, South Glastonbury; Herbert C. Pedersen, Vernon, both of Conn., and Vincent L. Iverson, Palm Beach Gardens, Fla., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed June 28, 1971, Ser. No. 157,515

Int. Cl. F01d *11/08*

U.S. Cl. 415—117 **6 Claims**

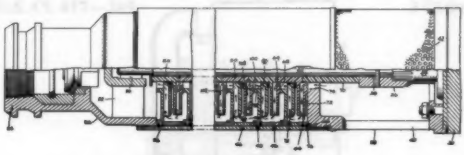


A gas turbine blade tip ring seal, which surrounds the blade tips to minimize turbine gas leakage around the blades, that incorporates a thermal protection system that allows modulation of the seal leading edge temperature level and thermal response to minimize seal deterioration during turbine transient operating conditions.

3,730,641
CENTRIFUGAL PUMPS

Donald L. Gordon, Kimmells's South Shores, Ind., assignor to Flint & Walling, Inc., Kendallville, Ind.

Filed March 10, 1972, Ser. No. 233,570
Int. Cl. F04d *29/44, 13/08, 7/00*
U.S. Cl. 415—199 A 9 Claims

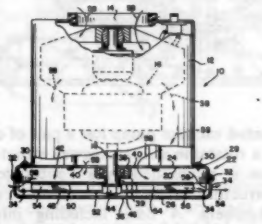


A multi-stage submersible centrifugal pump comprising a drive shaft having a plurality of plastic impellers mounted thereon for rotation therewith. Such impellers have hubs mutually engageable in stacked relation. A plurality of diffusers in stacked relation, one for each impeller, is provided with a diffuser plate having an annular embossment coaxially disposed with respect to a central opening in the plate. This annular embossment is engageable with similar annular embossment on the impeller which coaxially encircles the inlet opening therein, both embossments having radially extending sealing faces which are engageable with each other thereby to prevent recirculation of water between stages. The impeller hubs as well as the engageable annular embossments are formed of particular plastic materials, the two annular embossments being of different plastic materials which are nonfusible, lubricous, and have "cold flow" properties which permit deformation of at least one of the embossments during pump operation. Particular plastic materials and dimensions are so selected that ordinary manufacturing tolerances may be compensated for by reason of the "cold flow" properties of the plastics whereby in one case deformation of the engaged plastic hubs may occur to provide sealing engagement of the two annular embossments, or alternatively deformation of one of the annular embossments engaged with the other may occur to provide thrust-transmitting engagement of the hubs.

3,730,642
COOLING MEANS FOR MOTOR OF A WET PICK-UP VACUUM SWEEPER

John W. Barnstead, Brazil, and Everett D. Wiseman, Columbus, both of Ind., assignors to Vernco Corporation, Columbus, Ind.

Filed Oct. 14, 1971, Ser. No. 189,128
Int. Cl. F04b *17/00*
U.S. Cl. 417—424 14 Claims

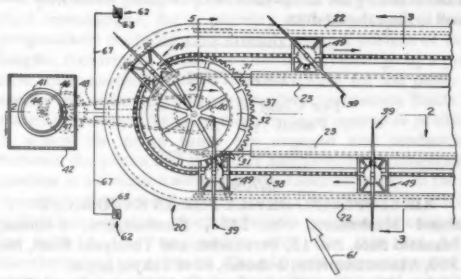


For use in a wet pick-up vacuum sweeper, a motor and fan assembly comprising a motor housing having ventilation openings for admitting cooling air, a motor disposed in the motor housing and having an output shaft extending from one end thereof, a fan element mounted on the shaft for rotation therewith to remove air from the canister of the vacuum sweeper, and a housing for the fan element connected to the said one end of the motor housing. The fan element housing provides a plurality of axially narrow, generally peripherally elongated exhaust ports spaced about its periphery and an entry port located generally concentrically with the shaft and providing communication between the fan element housing and the canister of the vacuum sweeper. One of the said housings provides wall means between the motor and fan element, this wall means having at least one exhaust opening providing communication between the housings so that rotation of the fan element draws cooling air through the motor housing and into the fan element housing to be expelled through its exhaust ports.

3,730,643
WIND POWER MACHINE

Fred E. Davison, Highwood, Mont.

Filed April 9, 1971, Ser. No. 132,651
Int. Cl. F01d *23/00*
U.S. Cl. 416—8 8 Claims



A wind power machine in which a plurality of sails connected to an endless chain move about an endless horizontal track to drive an electric generator. Each sail is mounted on an individual truck supported on the track. The endless track is arranged as two spaced apart parallel runs connected by semi-circular end sections. Each sail is rotatable about a vertical pivot on its truck and is controllable so that the sails can be positioned to drive the machine while moving along one run of the track and to be positioned to offer the least wind resistance while moving in the reverse direction along the other run of the track. Depending upon the direction of the wind the sails in most instances can be adjusted to provide drive along both runs of the track. The sails are adjusted by an electric motor drive controlled by a wind vane.

In a modified control system an anemometer is provided to over ride the wind vane control, to align the sails with the wind to present the least resistance to the wind when the wind power machine is subjected to winds of damaging force.

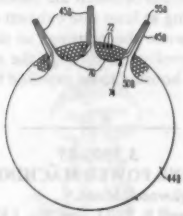
3,730,644
GAS TURBINE ENGINE

Albert Jubb, Kenilworth, England, assignor to Rolls Royce Limited, Derby, England

Filed June 23, 1970, Ser. No. 49,118
Claims priority, application Great Britain, June 26, 1967, 32,368/69
Int. Cl. F01d *5/08*
U.S. Cl. 416—95 5 Claims

An industrial gas turbine engine comprises a multi-stage axial compressor, combustion equipment, a multi-stage compressor driving turbine, a power turbine and an exhaust duct, the compressor driving turbine being provided with cooling means to cool the blades of said turbine. The cooling means comprises a flow of cool air from the compressor which flows onto the surface of each turbine rotor blade through slots in the rotor rim. The cool air also flows over the surface of the turbine rotor between adjacent blades and the space between adjacent blades is filled with a honeycomb material, the cells of which constitute ducts for the flow of cooling air. The stator

vanes of the compressor driving turbine are cooled both by air from the compressor and heat exchange means which com-



prises in a closed sodium filled loop, a pump, a coil in the cool air delivered by the compressor, a coil in each stator vane and a coil in the exhaust duct.

ERRATUM

For Class 417—424 see:
Patent No. 3,730,642

3,730,645

AIR SUPPLYING DEVICE FOR AN ENDOSCOPE

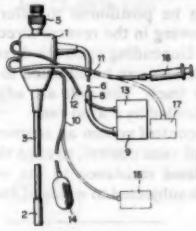
Fukami Mashakaru, No. 2461, Kamimeguro, 5-chome; Masaaki Sato, No. 13, Teradacho, and Toshiyuki Mori, No. 500, Akatsutsumicho, 2-chome, all of Tokyo, Japan

Division of Ser. No. 760,151, Sept. 17, 1968, abandoned. This application Sept. 25, 1970, Ser. No. 75,597

Claims priority, application Japan, Sept. 21, 1967, 42/80171; Feb. 1, 1968, 43/6414

Int. Cl. F04b *49/00*

U.S. Cl. 417—12 **3 Claims**



An air supplying device for use with an endoscope for supplying desired quantity of air into a hollow portion of a living body into which the forward end portion of the endoscope is inserted for the inspection thereof so that the hollow portion is inflated appropriately for the proper inspection and/or photographing of the hollow portion. The air supplying device comprises a foot switch, a timer and an air pump actuated by closing the foot switch through the timer for supplying air to the endoscope to which the air pump is connected. The timer is actuated each time the foot switch is closed for actuating the air pump so that the timer deenergizes the air pump after a predetermined time period set in the timer so that a predetermined quantity air is supplied to the endoscope each time the foot switch is closed while the air pump is stopped at any desired moment during the actuation of the timer by opening the foot switch so that excess quantity of air is prevented from being supplied to the endoscope.

3,730,646

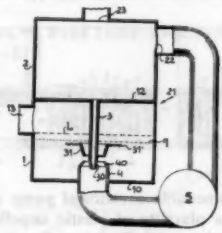
FLUID PROPELLING SYSTEM

Ambrogio Affri, and Giovanni Affri, both of Via Campo dei Fiori 26, Induno, Italy

Filed May 4, 1971, Ser. No. 140,188

Int. Cl. F04b *23/04, 23/08;* **F16h** *41/04*

U.S. Cl. 417—77 **12 Claims**



This invention relates to improvements in systems for propelling fluids i.e., gas and/or liquids. A system according to this invention comprises: a first reservoir filled with a liquid; a second reservoir preferably above said first reservoir, a duct connecting the bottom of said first reservoir to the top of said second reservoir; driving means, for feeding power into the system fluid, disposed in such duct; and an injector connecting the bottom of said second reservoir to the bottom of said first reservoir and extending for a short length into the inlet of said duct connecting the bottom of said first reservoir to the top of said second reservoir.

3,730,647

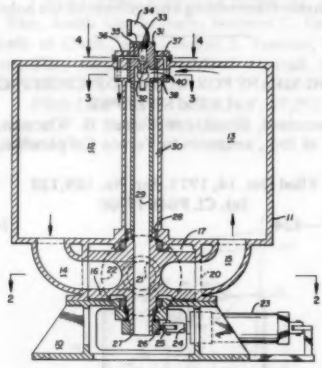
AIR ACTUATED VACUUM PUMP

Vincent P. Lonardo, 5890 Salt Springs Road, Girard, Ohio

Filed Aug. 25, 1971, Ser. No. 174,855

Int. Cl. F04f *1/02, 1/06, 5/48*

U.S. Cl. 417—122 **4 Claims**



An air actuated vacuum pump has a pair of chambers positioned about a rotatable air passageway structure in which a partial vacuum is established by a Venturi jet with the air passageway structure arranged to communicate alternately with said chambers. A base including inlet and outlet passageways and a valve forming extensions of the air passageway structure supports the chambers and the valve establishes alternate communication between the chambers and said inlet and outlet passageways respectively. Means is provided for rotating said air passageway structure and openings in the upper portions of said chambers alternately communicate with said air passageway structure so that partial vacuums may be created therein so as to effect a pumping action.

3,730,648

SWASH PLATE TYPE COMPRESSOR FOR AUTOMOBILE AIR-CONDITIONING

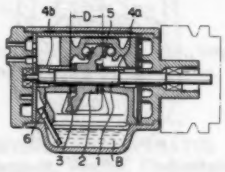
Sampei Komiya, No. 1745-1 Ohaza Shimokoizumi Ohizumi-cho, Ohra-gun, Gunma, Japan

Filed April 1, 1971, Ser. No. 130,216

Claims priority, application Japan, April 13, 1970, 45/34730

Int. Cl. F04b *1/12, 27/08*

U.S. Cl. 417—269 **3 Claims**



An improved swash plate type compressor for automobile air-conditioning, includes a swash plate chamber positioned centrally between axially spaced front and rear cylinder halves and having intermediate gas passageways forming a part of with the cylinder block gas passageways which inter-communicate between the suction chambers and the gas storage-discharging chambers of the cylinder halves. Further, the swash plate chamber forms an oil reservoir portion aligned and communicating with the oil reservoir portions of the cylinder halves and constituting a part of oil reservoir for the compressor.

3,730,649

SHIFT ELEMENT FOR GAS TURBINE FOR SHIFTING BETWEEN SERIES AND PARALLEL OPERATIONS

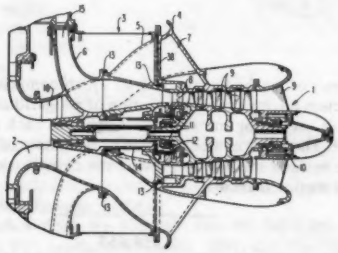
Werner Bruder, Neckarrems, and Hubert Grieb, Stuttgart, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Germany

Filed June 3, 1971, Ser. No. 149,699

Claims priority, application Germany, June 3, 1970, P 20 27 222.4

Int. Cl. F04b *17/00*

U.S. Cl. 417—408 **32 Claims**



A shifting element for gas turbines for shifting between series and parallel operation which is arranged concentrically between two turbo-units and is subdivided into channel sectors for the connection of the flow paths of the turbo-units with each other or for the connection of the turbo-units with an inlet and a gas discharge; the shifting element consists of at least two mutually rotatable parts arranged one behind the other, of which the forward part is provided with a gas inlet and with a connection to the gas outlet of the upstream turbo-unit while the rear part is provided with a connection to the gas inlet of the downstream turbo-unit and with a gas outlet.

3,730,650

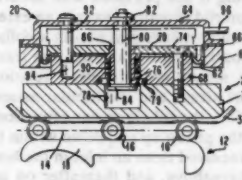
PERISTALTIC PUMP AND SYSTEM THEREFOR

Nelson G. Kling, deceased, late of Ocala, Fla. (by Alice Irene Kling, administratrix), assignor to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed Sept. 14, 1970, Ser. No. 71,773

Int. Cl. F04b *43/08, 43/12, 45/06*

U.S. Cl. 417—475 **7 Claims**



A peristaltic pump is provided, which may have auxiliary fluid introduction, for a plurality of resilient pump tubes progressively occluded concurrently along a portion of their lengths, recurringly, to advance fluids therethrough by a pressure roller assembly; and a control system for the pump to render the roller assembly inoperative to advance fluids. A platen is mounted for movement from an operative position, in which the pump tubes are engaged and sandwiched between the platen and the roller assembly, to an inoperative position in a direction away from the roller assembly. In the inoperative position of the platen, a tube or tubes of the auxiliary fluid introduction, which includes a pressure pin cooperating with a pad engageable with the tube or tubes therebetween, are released. The platen is power-operated to move to at least one of the two aforementioned positions thereof.

3,730,651

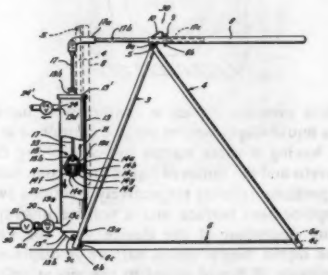
PUMP AND FOLDING SUPPORT ARRANGEMENT THEREFOR

Lonnie T. Ellis, Route 2, Box 33-A, Orange, Tex.

Filed Jan. 12, 1972, Ser. No. 173,105

Int. Cl. F04b *21/04, 9/02*

U.S. Cl. 417—554 **6 Claims**



A pump and support arrangement therefor includes a first generally triangular frame means for pivotally supporting a hollow pump housing at its lower end. The converging sides of the first frame means are provided with a pivotal connection adjacent their upper ends and an additional frame means of a generally conforming triangular configuration and somewhat larger is also connected to the same pivot at its upper end. This enables the first frame means and the additional frame means to be pivoted toward and away from each other, so that when they are pivoted toward each other, the first frame means is nested within the additional frame means. Lock means are provided so that when the frame means are spread apart, they may be retained in such spread apart relationship for supporting the pump during operation.

The hollow housing of the pump includes a piston with an opening therein and valve means for accommodating flow through the piston in one direction, but preventing flow in another direction. A piston rod is connected to such valve means and extends out the upper end of the hollow housing and is provided with a support means pivotally connected thereto which is telescopically received within tubular means that are pivotally carried by the same pivotal support which pivotally supports the first and additional frame means.

The piston rod support means and the tubular housing telescopically receiving it are provided with securing means for securing the piston rod support means in an extended position relative to the tubular means and also in a collapsed position relative to the tubular means when the first frame means and additional frame means are in nested relation. When the piston rod support means and the tubular means are secured in extended relation, the tubular means functions as a handle to aid in moving the piston up and down within the housing so as to move fluid received from an inlet in the housing through the piston and thereabove, and thereafter on an upstroke of the piston, the valve means closes and moves the trapped fluid through an outlet in the housing.

3,730,652

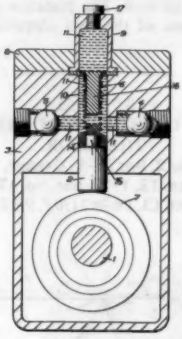
FLUID PRESSURE DEVICES

George Wavell Roberts, Crofton, near Wakefield, England, assignor to Gravoki Systems Limited, Hinckley, Leicestershire, England

Continuation of Ser. No. 53,374, July 9, 1970. This application Sept. 21, 1972, Ser. No. 291,034

Int. Cl. F01b *31/14*; **F04b** *21/02*, *49/00*

U.S. Cl. 417—568 **10 Claims**



In a fluid pressure device a compressible liquid is acted upon by a liquid displacement surface contained in a pressure chamber having a valve means for controlling the inlet of liquid thereto and the outlet of liquid therefrom. Said chamber includes portions defining respectively a volume swept by the liquid displacement surface and a volume unswept thereby; and during operation of the device with the valve means closed the liquid displacement surface is displaced to compress a volume of liquid equal to the swept volume into a volume of liquid equal to the unswept volume to produce a predetermined liquid pressure within the pressure chamber without any output of compressible liquid from the device.

3,730,653

VARIABLE DELIVERY PUMP

Gilbert H. Drutchas; Hubert M. Clark, both of Birmingham, and Harold A. Melendy, Troy, all of Mich., assignors to TRW Inc., Cleveland, Ohio

Filed Nov. 24, 1971, Ser. No. 201,876

Int. Cl. F01c *21/16*; **F04c** *15/04*, *29/10*

U.S. Cl. 418—32 **12 Claims**

A pump utilizing basically the same pumping elements as currently in use in a slipper-type pump having a rotor rotatable in a cam ring providing a double-lobed working chamber and wherein the rotor carries a plurality of slipper-type pumping elements which are free to move radially and to rock angularly in following the adjoining wall of the bore contour is modified by providing the cam ring and the adjoining pressure

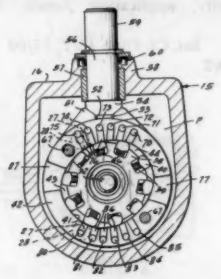


plate with two sets of multiple passages, for example, sets of six, and adding a freely rotatable actuator plate movable from a neutral position to either a forward position or a reverse position, thereby to preferentially bias the actuator plate in such a manner as to selectively exclude or include egress holes.

3,730,654

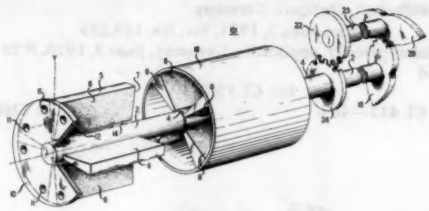
GEAR ARRANGEMENT FOR PROVIDING AN OSCILLATING ROTATIONAL MOTION

William McMahon, 20 Hillside Ave., Summit, N.J.

Filed Feb. 14, 1972, Ser. No. 226,127

Int. Cl. F01c *1/00*; **F16h** *35/02*; **F04c** *1/00*

U.S. Cl. 418—34 **16 Claims**



A pair of meshed gears each of which comprises a plurality of sectors having the configuration of a logarithmic spiral provide an oscillating motion with respect to each other as they rotate. The gears can be coupled to the rotors of rotary piston machines and the like to provide the desired oscillating rotational motion thereto.

3,730,655

SEALING BAR FOR A ROTARY PISTON INTERNAL COMBUSTION ENGINE

Heinz Lamm, Esslingen-St. Bernhardt, Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart-Unterturkheim, Germany

Filed Nov. 12, 1971, Ser. No. 198,134

Claims priority, application Germany, Nov. 14, 1970, P 20 56 068.3

Int. Cl. F04c *27/00*

U.S. Cl. 418—122 **24 Claims**

A sealing bar for a rotary piston internal combustin engine, especially of trochoidal construction, which is arranged radially movably in a piston groove provided with a spring and which sealingly slides with its head portion along a running

surface in the housing casing of the internal combustion engine whereby two slide members, preferably constructed

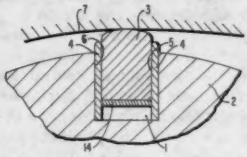


plate-shaped, are arranged along the longitudinal sides between the sealing bar and the piston groove.

3,730,656

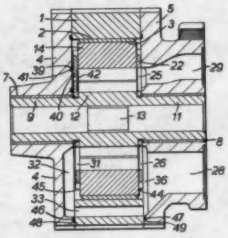
HYDRAULIC APPARATUS

Dennis Ernest Lambeth, Benhall, Cheltenham, England, assignor to Dowty Technical Developments Limited, Cheltenham, England

Filed March 22, 1971, Ser. No. 126,553

Int. Cl. F01c *19/08;* **F03c** *3/00;* **F01c** *1/10*

U.S. Cl. 418—131 **2 Claims**



A hydraulic displacement device such as an internal gear pump having an internally toothed gear in mesh with an externally toothed gear, a high pressure zone and a low pressure zone defined within the internally toothed gear and separated by the meshing position of the gears and an end bearing member loaded by liquid at the pressure of the high pressure zone to engage the end surfaces of the gears. In order to reduce excessive friction between the end bearing member and the gears the bearing member has an area of engagement with an end surface of the gears in the vicinity of the high pressure zone with part of its boundary at a position intermediate the tooth root radius and the periphery of the internally toothed gear.

3,730,657

MOLD ASSEMBLY FOR PRESSING CONCRETE

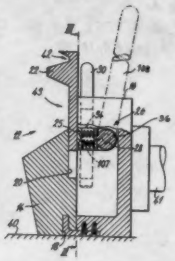
Michael Anley Malet, and David Leslie Hills, both of St. Albans, England, assignors to National Research Development Corporation, London, England

Continuation of Ser. No. 879,879, Nov. 25, 1969, Pat. No. 3,667,880. This application May 28, 1971, Ser. No. 148,099

Int. Cl. B28b *3/04, 7/20*

U.S. Cl. 425—3 **13 Claims**

A mould assembly for use in a concrete pressing process includes edge formers presenting mould surfaces to the concrete filling and slidable in the direction of pressing. Friction pads, permanent magnets or non-permanent magnets, are used firstly to hold the edge formers in place whilst the concrete is being introduced into the mould and secondly to control the downward movement of the edge formers when they are engaged by the moving platen of the press. During the latter part of the pressing process the friction pads or magnets are withdrawn or de-energised (as the case may be) so that the edge formers are free to move simultaneously with the adjacent edge surfaces of the concrete filling which expands slightly after withdrawal of the press platen. The friction pads or magnets are brought into operation again for the withdrawal of wall members of which the edge formers form a



part. In some embodiments of the invention the presence of a plunger which is engaged by the moving platen of the press during the latter part of the pressing process allows the friction pads or magnets to be automatically controlled.

3,730,658

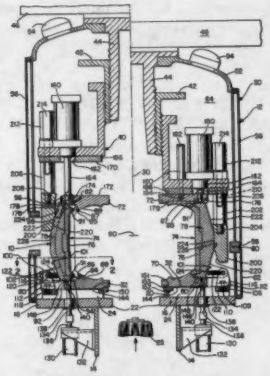
SEGMENTED TIRE MOLD

Theodore F. Marra, Barberton, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed June 25, 1971, Ser. No. 156,632

Int. Cl. B29h *17/00, 5/08*

U.S. Cl. 425—47 **21 Claims**



A tire curing mold for use in a press having a fixed platen and a movable platen, the mold including a first and a second sidewall molding member and a plurality of tread molding elements. A plurality of clevises are attached by T-bolts to a ring secured to one platen about the axis of the mold. An arm mounted on each of the tread molding elements is slotted to receive a pivot of the respective clevis so that each tread molding element is pivotable about the respective pivots. Hydraulic cylinders can lift the lower sidewall member to tilt the tread elements outwardly of and angularly with respect to the axis out of contact with a tire in the mold.

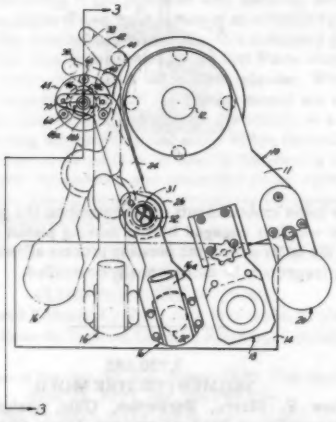
The foregoing abstract is not to be taken as limiting the invention of this application, and in order to understand the full nature and extent of the technical disclosure of this application, reference must be made to the accompanying drawings and the following detailed description.

3,730,659

POWDER DISPENSER FOR A POWDER COMPACTING PRESS

Joseph E. Smith, Birmingham, and Georges D. DeTroyer, Grosse Ile, both of Mich., assignors to Wolverine-Pentronix, Inc., Lincoln Park, Mich.

Filed Oct. 4, 1971, Ser. No. 185,932
Int. Cl. B29c *3/00*
U.S. Cl. 425—78 **15 Claims**



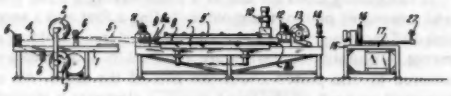
A work station positioner for a powder compacting press operable to move through three separate operations, namely, fill, press and eject, in which there is provided an improved controllably vibratable powder dispenser mechanism actuable during the fill operation. The amplitude of vibration of the powder dispenser and the frequency with which it is vibrated are selectively adjustable for the particular type and particle size of powder material being used.

3,730,660

APPARATUS FOR CONTINUOUSLY PRODUCING TUBULAR BODIES OF FOAMED MATERIAL

Hermann-Josef Raffenberg, Ludinghausen, Germany, assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Continuation-in-part of Ser. No. 760,280, Sept. 17, 1968, abandoned.
Filed Feb. 23, 1971, Ser. No. 118,127
Int. Cl. B29c *27/16, 27/28*
U.S. Cl. 425—122 **8 Claims**



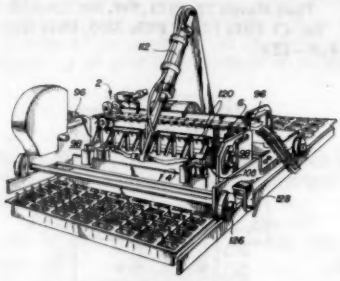
An apparatus for continuously making a tubular polyurethane foam insulation adapted to be installed about a pipe or the like combines a stationary mold and a mandrel disposed in the mold with means for convolutely winding a continuous web about the mandrel and out through a slot in the mold wall, means for convolutely winding a second web about the first web and out through the same slot, means for placing a foamable polyurethane mixture between the webs and means for pulling the exposed portions of the webs longitudinally and thereby moving the two radially spaced webs through the mold while the foamable reaction mixture forms a longitudinally split tubular foam body having the first web as a liner and the second as a cover. The product produced by the apparatus and a process for making the product are also provided.

3,730,661

STICK INSERTER

Theodose Tremblay, Montreal, Quebec, Canada, assignor to John Lewis Inc., Montreal, Quebec, Canada

Filed Oct. 26, 1970, Ser. No. 84,099
Int. Cl. A23g *1/20, 1/22, 3/12, 3/16, 3/18, 5/02*; B29c *27/14*
U.S. Cl. 425—126 **13 Claims**



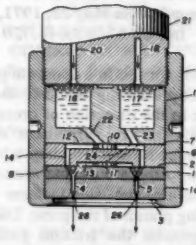
A machine inserts sticks into rapidly freezing confections by presenting a tape which holds the sticks in a horizontal plane to a gripping mechanism. After this gripping mechanism has gripped certain sticks, it — the gripping mechanism — is moved away from the tape and turned; and it is then plunged downwardly towards the molds which are full of confection mixture, which is freezing rapidly, so that the sticks penetrate into and are held by the confection mixture. The sticks are released and the gripping mechanism is returned to the tape to begin the cycle again. Fresh sticks are presented to the gripping mechanism because movement of the tape took place while the gripping mechanism was inserting the sticks in the freezing mixture.

3,730,662

SPINNERET ASSEMBLY

Walter J. Nunning, Pensacola, Fla., assignor to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 886,194, Dec. 18, 1969, abandoned.
This application Dec. 1, 1971, Ser. No. 203,895
Int. Cl. B29f *3/12*
U.S. Cl. 425—131 **3 Claims**



A spinneret assembly for melt spinning bicomponent filaments is provided. A spinning block couples a spinneret plate,

a distributor plate, and a dual reservoir plate in operative spinning relation. Grooves extend radially from a central concavity at the interface of spinneret plate and the distributor plate and at the interface of the distributor plate and dual reservoir.

3,730,663

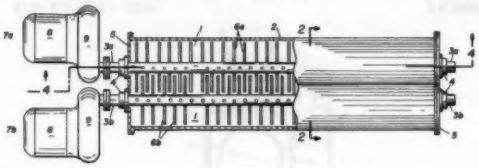
PELLETIZER

Paul N. Hare, Swartz, La., assignor to Cities Service Company, New York, N.Y.

Filed June 25, 1971, Ser. No. 156,722

Int. Cl. B29b *1/03*

U.S. Cl. 425—222 **10 Claims**



A powder pelletizer having twin shafts which extend axially through an elongated conduit which bounds the pelletizing zone. Each of the shafts has a multiplicity of agitating members affixed thereto at spaced intervals along the length of the shaft and which extend radially outward therefrom. The agitating members of each shaft are arranged to move into and out interdigitating relationship with agitating members of the other shaft upon rotation of both shafts. The longitudinally extending peripheral wall of the conduit bounding the pelletizing zone is proximal to the tip-ends of the agitating members which are not interdigitating during rotation of the shafts.

3,730,664

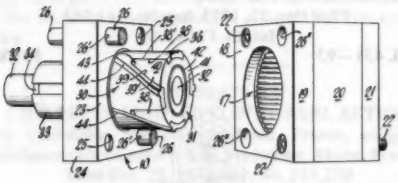
MOLD APPARATUS FOR MAKING A CLOSURE CAP

Eric Alex Hultgren, Westport, Conn., assignor to Eyelet Specialty Company, Wallingford, Conn.

Filed Nov. 24, 1971, Ser. No. 201,780

Int. Cl. B29f *1/14*

U.S. Cl. 425—338 **4 Claims**



The invention contemplates a three-part force-plug structure for determining the inner-wall configuration of a cap for removable closure of a bottle or other container, wherein one or more bayonet-type lugs on the cap are relied upon to establish a twist-lock engagement with the container. The three parts are coaxially related and are guided for longitudinal displacement with respect to each other, to determine (*a*) a first mutual relationship for the molding operation, (*b*) a second mutual relationship for clearing the molded lug or lugs from axial interference with the force-plug parts, and (*c*) a third mutual relationship for axially ejecting the molded part. A helically advancing spline formation on the outer cylindrical surface of one of the force-plug parts determines a corresponding spline groove in the molded piece, so that in the course of displacement from the first to the second mutual relationship, the molded piece is necessarily driven in partial rotation, to an extent adequate to clear the molded lug or lugs, for free piece ejection in the course of displacement from the second to the third mutual relationship.

3,730,665

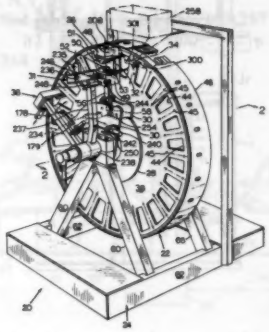
MOLDING APPARATUS

Michael Joseph Fortin, Stouffville, Ontario; Joseph T. Latchford, Toronto, Ontario, and Marinus Theodorus Vanden Heuvel, King City, Ontario, all of Canada, assignors to Fortin-Latchford Limited, Scarborough, Ontario, Canada

Division of Ser. No. 878,004, Nov. 19, 1969, Pat. No. 3,635,612. This application Sept. 3, 1971, Ser. No. 177,667

Int. Cl. B29b *5/04*; B29c *7/00*

U.S. Cl. 425—259 **5 Claims**



The invention provides a molding station for use in an automatic molding machine used primarily for encapsulating small components. The molding station is attached radially to a wheel mounted for rotation. Each station includes a mold cavity defined by inner and outer mold halves, and a radial cam follower co-operates with a fixed mold cam to move the inner mold half radially between open and closed positions. An injector piston is reciprocally journalled inside a tube in the mold cam follower and molding material is heated in a tube upon closing the mold. A radial injector cam follower and fixed injector cam cooperate to move the piston radially outwards to inject the charge from the tube into the mold cavity. The station is serviced as the wheel rotates by a parts feeder, a material feeder, and a parts stripper. A hot oil system is coupled to the molding station for heating the charge and a vacuum system is used to evacuate the mold cavity as injection commences.

3,730,666

THREADED CLOSURE HIGH PRODUCTION ISOSTATIC MOLDING DEVICE

Arnold Gordon Bowles, Warren, Pa., assignor to National Forge Company, Irvine, Pa.

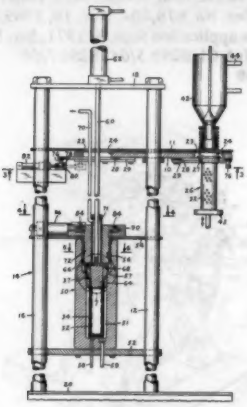
Filed Jan. 10, 1972, Ser. No. 216,572

Int. Cl. B30b *5/02*, *11/02*; B28b *3/00*

U.S. Cl. 425—405 H **8 Claims**

A high production isostatic molding device comprising an upright isostatic press having an interrupted thread type closure and a turntable for rotating a plurality of elastomeric molds open at one end and hung beneath the table sequentially through various processing stages including filling, pressing and unloading. At one position a given mold is filled with compactible material from a hopper while being simultaneously vibrated. At another position the mold is positioned over the open end of a pressure vessel and lowered into the pressure vessel by a hydraulic ram which simultaneously seals the open end of the mold and lowers an interrupted thread closure plug into engagement with the correspondingly threaded open end of the vessel. An actuator rotates the closure to seal the vessel. An actuator rotates the closure to seal the vessel. After the mold is isostatically compacted by pres-

surized fluid within the sealed vessel the process is reversed to unseal the pressure vessel and to return the mold to the turnta-



ble which thereafter rotates the compacted mold to a stripping position while simultaneously positioning a new filled mold over the open end of the vessel.

3,730,667

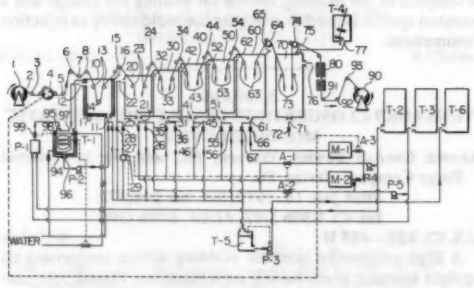
APPARATUS FOR THE PRODUCTION OF A SYNTHETIC PAPER-LIKE PRODUCT FROM A POLYMER FILM

Kaneyasu Tani, and Shiro Kawazoe, both of Tokyo, Japan, assignors to Nippon Kakoh Seishi K. K., Tokyo, Japan

Filed June 1, 1970, Ser. No. 42,060

Int. Cl. B41m *5/14*; D21h *5/00*

U.S. Cl. 425—445 **6 Claims**



Apparatus for the continuous process for the preparation of synthetic paper by treatment of a polymer film to produce an opaque printable surface the process including treating the surface with a swelling agent followed by a coagulating agent with intermediate treatment in one or more baths containing adjustable quantities of swelling and coagulating agents, said baths being provided with overflow means leading to the preceding bath to provide adjustment for changes caused by carry-over from one bath to another by the advancing film.

3,730,668

COMBUSTION METHOD OF GAS BURNERS FOR SUPPRESSING THE FORMATION OF NITROGEN OXIDES AND BURNER APPARATUS FOR PRACTICING SAID METHOD

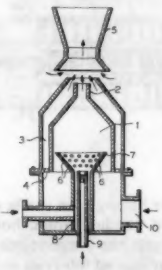
Hirofumi Iida, Chiba, and Kazufumi Watanabe, Yokohama, both of Japan, assignors to Tokyo Gas Company Limited, Tokyo, Japan

Filed May 21, 1971, Ser. No. 145,728

Claims priority, application Japan, March 3, 1971, 46/11207

Int. Cl. F23m *3/04*

U.S. Cl. 431—10 **5 Claims**



The present invention relates to a novel method for suppressing the formation of nitrogen oxides formed in the combustion of gaseous fuels with air and a novel burner for practicing said method. Said burner comprises a combustion chamber having a converged nozzle portion formed at one end thereof and a draft tube having an upwardly expanding vertical cross-section and spaced ahead of said nozzle portion for guiding the combustion gases exhausted from said combustion chamber.

3,730,669

PHOTOGRAPHIC FLASHLAMP UNIT HAVING CONTROL STRUCTURE ON BASE

John W. Shaffer, Williamsport, Pa., assignor to GTE Sylvania Incorporated, Danvers, Mass.

Filed Dec. 23, 1971, Ser. No. 211,553

Int. Cl. F21k *5/02*

U.S. Cl. 431—93 **10 Claims**

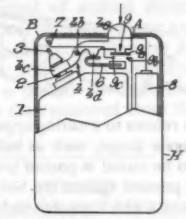
A multilamp flash unit or flashcube having a base upon which is supported a plurality of percussively-ignitable flashlamps, each having a primer tube depending therefrom, and a plurality of preenergized striker springs individually releasable to fire a respective one of the flashlamps by impact against its primer tube. The base includes a plurality of bores, into which the primer tubes are inserted for supporting the flashlamps, and a plurality of apertures, each adjacent a respective striker spring. The unit is usable on a camera having a mechanical actuating member that sequentially is mova-

ble into the unit via the apertures, upon indexing of the unit, to release successive striker springs and thereby fire successive flashlamps in the unit. A control ramp is located between each aperture and bore in the flashcube base for guiding the travel of each striker subsequent to its release to assure reliable firing of the respective flashlamp.

3,730,670
CURRENT-SAVING ELECTRICAL IGNITER FOR GAS LIGHTERS

Jacques Lambert, Paris, France, assignor to Flaminaire Marcel Quercia, Paris, France

Filed Feb. 2, 1971, Ser. No. 111,983
Claims priority, application France, Feb. 17, 1970, 7005608
Int. Cl. F23q *2/16*
U.S. Cl. 431—256 **2 Claims**

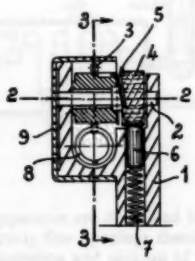


A gas lighter wherein a filament is heated to a temperature at which it ignites a stream of gaseous fuel in response to or at least substantially simultaneously with opening of a valve which permits pressurized gaseous fuel to escape from a tank. In order to save electrical energy, the circuit of the filament is opened automatically with a delay which invariably suffices to insure the ignition of the fuel stream. Delayed opening of the circuit can be effected by mechanical means, by an electronic circuit or by a confined body of a current-conducting liquid. The valve opening member of the lighter can be provided with, directly coupled to or made independent of that part or of those parts which complete the circuit simultaneously with the opening of the valve. The lighter furnishes a flame as long as the valve remains in open position but the circuit of the filament is opened with a fixed delay following completion of the circuit to thereby insure that the consumption of electrical energy takes place only during that interval which is needed to heat the filament to a temperature at which the fuel stream is ignited.

3,730,671
CIGARETTE-LIGHTER FLINT WHEEL ACTION

Pierre Chevallier, Sainte-Foy-les-Lyon, France, assignor to Etablissements Genoud & Cie, Venissieux, Rhone, France

Filed Dec. 29, 1971, Ser. No. 213,270
Int. Cl. F23q *1/02*
U.S. Cl. 431—274 **3 Claims**

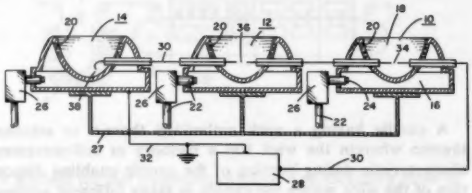


In this pyrophoric cigarette-lighter a casing is slidably mounted in the lighter body and has two end walls engaged internally by the opposite ends of a slightly prestressed coil spring in constant meshing engagement with a pinion operatively connected in the conventional manner with the flint wheel. Mechanical energy is stored in the spring and when released it is accelerated by continuing the exertion of pressure on the key-forming casing.

3,730,672
MULTI-BURNER GAS STOVE WITH PIEZOELECTRIC IGNITION

Don A. Berlincourt, Chagrin Falls, and Earl O. Schweitzer, Wickliffe, both of Ohio, assignors to Vernitron Corporation, Great Neck, N.Y.

Filed Jan. 4, 1971, Ser. No. 103,757
Int. Cl. F23q *3/00*
U.S. Cl. 431—264 **7 Claims**

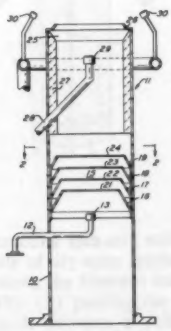


A multi-burner gas stove utilizing a piezoelectric ignition system for igniting the gas which has a specific gravity greater than air. The system includes a circuit establishing a spark gap located below the outlet of the gas burner so that the combustible gas-air mixture before ignition will gravitate to and envelop the gap and after ignition the flame will be vertically spaced above the gap.

3,730,673
VENT SEAL

John F. Straitz, III, Cheltenham, Pa., assignor to Combustion Unlimited, Incorporated, Elkins Park, Pa.

Filed May 12, 1971, Ser. No. 142,700
Int. Cl. F23d *13/20*
U.S. Cl. 431—278 **3 Claims**



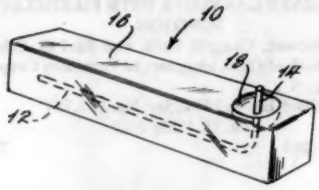
A vent seal is provided for use with vent stacks, blow down lines, flare systems and the like to prevent entrainment of air into the stack which comprises a diode interposed in the stack below the top, the diode comprising spaced frustoconical concentric baffles with aligned central openings providing an obstruction to down flow of air within the stack but not retarding upward delivery of hot gas.

3,730,674

CANDLE

Bette L. Gross, 411 N. 7th St., Holly, Mich.

Filed July 19, 1971, Ser. No. 163,841
Int. Cl. F23d 13/16
U.S. Cl. 431—288 18 Claims



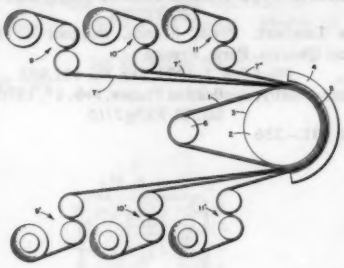
A candle having a wick embedded therein or attached thereto wherein the wick has a memory or self-movement characteristic during burning of the candle enabling disposition of the wick within the candle in many different arrangements.

3,730,675

CURING APPARATUS FOR ELONGATE ELASTOMERIC ARTICLES

Augusto Previati, Milan, Italy, assignor to Industrie Pirelli S.p.A., Milan, Italy

Filed Aug. 3, 1971, Ser. No. 168,691
Claims priority, application Italy, Aug. 7, 1970, 28402 A/70
Int. Cl. F27b 9/28
U.S. Cl. 432—60 10 Claims



The application relates to a curing apparatus for elastomeric articles of elongate shape, such as belts. The apparatus is such that a belt to be cured is passed over a heated rotating drum. This belt is pressed against the hot surface of the drum by other belt elements which are driven by a system of rollers which system includes the heated drum as a rotating element thereof.

CHEMICAL

3,730,676
DYE TRANSFERRING METHOD

Geoffrey Allan Smith, Melrose, England, and Alan James Laidlaw, Selkirk, Scotland, assignors of fractional part interest to Joseph Dawson (Holdings) Limited, Bradford, England

No Drawing. Filed May 10, 1971, Ser. No. 141,970

Claims priority, application Great Britain, May 11, 1970, 70/22,689

Int. Cl. D06p *3/16*

U.S. Cl. 8—2.5 **2 Claims**

A method of transferring coloured dyes from a printed paper transfer onto a textile fabric or material particularly when it is comprised of animal fibres. The fabric is padded with a chemical mixture having an aqueous phase and a printing paste thickener. A press applies heat and pressure to the fabric which is in contact with the printed paper transfer, for a period not exceeding ten minutes. The printed fabric is then removed from the press, washed and dried.

3,730,677
DYEING KERATINOUS FIBERS WITH A QUINONEIMINE AND A COUPLER

Gregoire Kalopissis, Paris, Andree Bugaut, Boulogne-sur-Seine, and Francoise Estradier, Paris, France, assignors to L'Oreal, Paris, France

No Drawing. Filed July 6, 1970, Ser. No. 52,741

Claims priority, application France, July 8, 1969, 59,063

Int. Cl. A61k *9/12*

U.S. Cl. 8—10.2 **8 Claims**

A composition for dyeing keratinous fibers comprises an aqueous solution of at least one quinoneimine and an aqueous solution of at least one coupler.

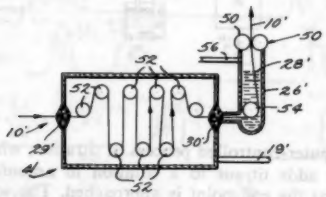
3,730,678
PROCESS FOR TREATING TEXTILE MATERIALS

Frederick C. Wedler, and Kenneth Y. Wang, both of Greensboro, N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Continuation-in-part of Ser. Nos. 665,894, Sept. 6, 1967, abandoned, and Ser. No. 746,972, July 23, 1968, which is a continuation-in-part of Ser. No. 665,894, Sept. 6, 1967, abandoned. This application Oct. 28, 1970, Ser. No. 84,572

Int. Cl. B05c *11/115*

U.S. Cl. 8—149.1 **4 Claims**



A process and apparatus are described for impregnating a textile having relatively fine openings therein with a treating liquid whereby penetration and pick-up of the liquid are improved by relatively strong vacuum degassing the textile immediately before impregnation.

3,730,679
PROCESS FOR WET TREATMENT AND SUBSEQUENT DRYING OF A TEXTILE WEB

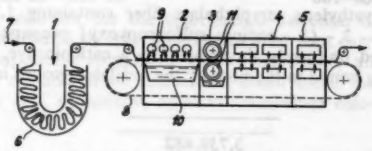
Manfred Schuierer, Erbach/Odenwald, Germany, assignor to Bruckner-Apparatebau Michelstadt GmbH, Erbach/Odenwald, Germany

Filed March 17, 1971, Ser. No. 125,177

Claims priority, application Germany, April 2, 1970, P 20 15 759.9; Feb. 25, 1971, G 71 07 117.5

Int. Cl. D06c *1/08*

U.S. Cl. 8—151 **8 Claims**



A process for wet treatment of fabric web including steps of washing, liquid removal, drying and airing, in which shrinking takes place in wet treatment zone before web is laid evenly on transport means for drying. Apparatus for carrying out the process provides essential treatment stations and mesh belt or suction drum transport means for conveying the web to be treated through each of the successive stages of treatment.

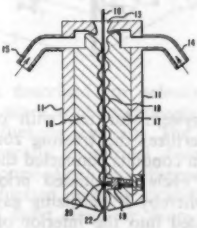
3,730,680
PROCESS FOR EXTRACTING SOLVENT FROM POLYAMIDE FILAMENTS

Braxton C. Bowen and Jackie A. Weir, Richmond, Va., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 5, 1972, Ser. No. 215,603

Int. Cl. D06c *1/06*

U.S. Cl. 8—151.2 **3 Claims**



A process for extracting spin-mix solvent from a moving continuous bundle of dry-spun synthetic filaments and for detecting drips along the filament bundle. The process comprises sequentially (1) passing the bundle in a substantially straight path between a pair of rigid corrugated sheets positioned in parallel planes such that they cooperate to form an undulating channel between them; (2) forcing a liquid, which is a solvent for the spin-mix solvent but not for the polymer of which the synthetic filaments are composed, through the undulating channel at a velocity which causes it to pass along the channel back and forth through the bundle; and (3) passing the filaments past an appendage that is adjustable to allow

passage of a standard thickness continuously moving bundle but to prevent passage of a bundle of larger than standard thickness. The appendage contains passageways through it to permit carry-off of said liquid.

3,730,681

BASIC DYED POLYESTER FIBER MODIFIED WITH A DIHYDROXYALKOXY-PROPYL OR BUTYL SULFONATE

Louis E. Trapasso, Westfield, and Robert W. Stackman, Morristown, N.J., assignors to Celanese Corporation, New York, N.Y.

No Drawing. Application Sept. 26, 1966, Ser. No. 581,719, now abandoned, which is a continuation-in-part of application Ser. No. 502,520, Oct. 22, 1965. Divided and this application Feb. 2, 1971, Ser. No. 112,025

Int. Cl. D06p *5/04*

U.S. Cl. 8—168 **2 Claims**

A polyethylene terephthalate fiber containing 1,2-dihydroxy - 3 - (3 - sodium sulfopropyoxy) propane and permeated uniformly throughout by a cationic dye, said dye being bound in the fiber by the available groups in the fiber.

3,730,682

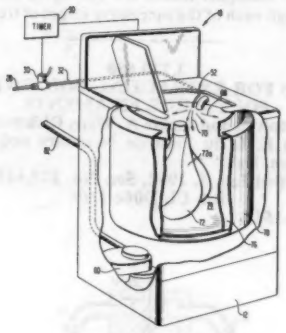
STERILIZATION SYSTEM FOR CLOTHES TREATING MACHINES AND METHOD OF USING

Robert D. Brubaker and Blanchard W. Brown, Albuquerque, N. Mex., assignors to Staphex Corporation

Filed Jan. 25, 1971, Ser. No. 109,258

Int. Cl. A61l *1/00;* **D06f** *39/00*

U.S. Cl. 21—58 **35 Claims**



A sterilization system for use with clothes treating machines which sterilizes the treating zones in the machines and the drain conduits connected thereto. An automatic sterilization cycle is initiated prior to each use of the machines whereby a sterilizing gas or aerosol or solution is distributed into the interior of the inner tub by a specially adapted nozzle. In combination with the spraying there may be used actuation of the agitator, inner tub, and drain pump of the machine to more thoroughly distribute the spray.

3,730,683

METHOD OF PROSPECTING FOR MERCURY AND ASSOCIATED NOBLE AND BASE METALS

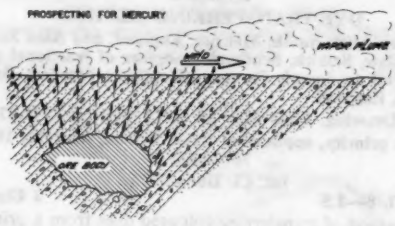
George H. Milly, Potomac, Md., assignor to Geomet Mining and Exploration Company, Rockville, Md.

Continuation-in-part of application Ser. No. 804,219, Mar. 4, 1969, now Patent No. 3,609,363, dated Sept. 28, 1971. This application Mar. 17, 1971, Ser. No. 125,084

Int. Cl. G01n *33/24*

U.S. Cl. 23—230 EP **5 Claims**

Prospecting, particularly prospecting for mercury and noble and base metals such as gold, silver, copper, zinc, and other metallic ores encountered in association with mercury, on the basis of the mobile gaseous phase of



mercury which diffuses through the earth's structure and becomes windborne.

3,730,684

THYROXINE DETERMINATION METHOD EMPLOYING THE COMPETITIVE PROTEIN BINDING TECHNIQUE

James A. Demetriou, Sherman Oaks, Calif., assignor to Bio-Science Laboratories, Van Nuys, Calif.

Filed Nov. 1, 1971, Ser. No. 194,683

Int. Cl. G01n *33/16, 23/10*

U.S. Cl. 23—230 B **5 Claims**

A method for use in determination of thyroxine in biological fluids which comprises extracting thyroxine with tetrahydrofuran and separating thyroxine from the precipitated proteins and then from the tetrahydrofuran, and thereafter equilibrating with thyroxine binding globulin and radioactive labeled thyroxine, removing unbound thyroxine and determining the radioactive labeled thyroxine by counting techniques.

3,730,685

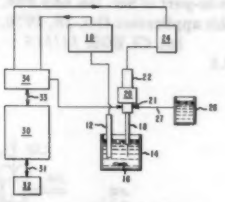
COMPUTER CONTROLLED METHOD OF TITRATION

Charles Anton Prohaska, Seaford, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 24, 1971, Ser. No. 118,342

Int. Cl. B01k *3/00;* **G01n** *27/10, 27/56*

U.S. Cl. 23—230 R **5 Claims**



A computer-controlled process of titration, wherein the computer adds titrant to a solution in amounts which decrease as the end point is approached. The solution is allowed to reach equilibrium between each stepwise addition of titrant. The computer calculates the titration end point by use of a curve fitting algorithm to fit data stored from a final preselected number of titration points to find the optimum constants for an appropriate mathematical equation, e.g., a cubic equation, relating solution pH as a function of titrant added and then computing the maximum slope of the equation.

3,730,686

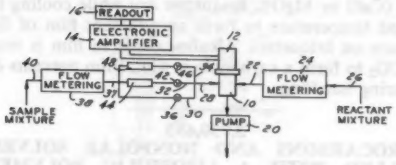
QUANTITATIVE MEASUREMENT OF SELECTED NITROGEN COMPOUNDS IN GASEOUS MIXTURES

Lawrence P. Breitenbach, Royal Oak, and Mordecai Shelef, Southfield, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed June 29, 1971, Ser. No. 158,003

Int. Cl. C01b *21/00, 21/20;* **G01n** *31/10*

U.S. Cl. 23—232 R **20 Claims**



Gaseous mixtures including nitrogen dioxide are passed through a converter containing molybdenum at a temperature of about 475° C. to convert the nitrogen dioxide to nitric oxide without converting significant amounts of any existing ammonia and without destroying any existing nitric oxide. The gaseous mixture leaving the converter is introduced into a reaction chamber where the chemiluminescence of the reaction of the nitric oxide and ozone is used to determine the amount of nitrogen dioxide in the original gaseous mixture. Subsequently, the gaseous mixture is passed through a second converter containing copper at a temperature of about 410° C. to convert any ammonia to nitric oxide and the increased chemiluminescence is used to determine the amount of ammonia in the original mixture.

3,730,687

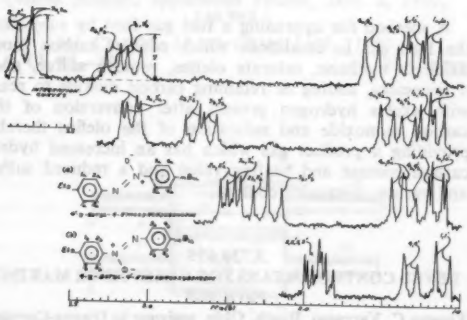
SPECTRAL SEPARATION AND ANALYSIS OF ISOMERIC AZOXYBENZENES

Roger E. Rondeau, Dayton, Ohio, assignor to the United States of America as represented by the Secretary of the Air Force

Filed Sept. 28, 1971, Ser. No. 184,386

Int. Cl. G01n *27/78*

U.S. Cl. 23—230 R **10 Claims**



A process is provided whereby tris (1,1,1,2,2,3,3-heptafluoro-7,7-dimethyl - 4,6 - octanedionate)europium(III) is added to a sample of a mixture of isomeric azoxybenzenes after which the sample is subjected to nuclear magnetic resonance. The spectrum obtained makes it possible to identify each isomer as well as to determine their relative amounts in the mixture.

3,730,688

INDICATOR FOR THE DETECTION OF NICKEL IONS

Dieter Schmitt, Alfred Stein, and Wilhelm Baumer, Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

No Drawing. Filed Mar. 9, 1971, Ser. No. 122,541

Claims priority, application Germany, Sept. 3, 1970, P 20 43 600.4

Int. Cl. G01n *31/22*

U.S. Cl. 23—253 TP **15 Claims**

An indicator for the colorimetric detection of nickel ions is formed by impregnating an absorbent carrier with a composition comprising dimethylglyoxime, an alkali-metal or ammonium thiosulfate, alkali metal fluoride, a buffer and, optionally, hydroxylammonium chloride.

3,730,689

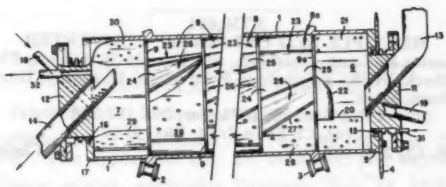
APPARATUS FOR LEACHING CORE MATERIAL FROM SHEARED SEGMENTS OF CLAD NUCLEAR FUEL PINS

Clyde H. Odom, Knoxville and Maurice H. Kunselman, Oak Ridge, Tenn., assignors to the United States of America as represented by the United States Atomic Energy Commission

Filed Feb. 12, 1971, Ser. No. 114,769

Int. Cl. B01d *11/02*

U.S. Cl. 23—269 **8 Claims**



Apparatus is described for selectively dissolving or leaching one or more solid components of a mixture such as clad nuclear fuel pin segments. The apparatus includes a rotatable, generally cylindrical drum designed to operate with its longitudinal axis disposed horizontally. A plurality of perforated, radially extending, circular partitions are spaced apart along the drum axis to form a series of feed, leaching, and discharge compartments. Axial movement of solids through the drum is restricted by the partitions while the dissolvent is permitted to flow through the perforations therein in a substantially unrestricted manner. Transfer chutes in the shape of slotted, skewed, conical frustums are provided within each leaching compartment for transferring solids between compartments only when the drum rotation is reversed one turn with respect to its normal direction of rotation during a leaching operation. Mixing or agitation of the solids to enhance dissolution is accomplished without solids transfer during rotation of the drum by perforated mixing baffles which extend axially and radially within the peripheral region of each leaching compartment. Feed and discharge compartments containing transfer baffles are provided at opposite ends of the drum for receiving unprocessed mixtures and for discharging undissolved solids.

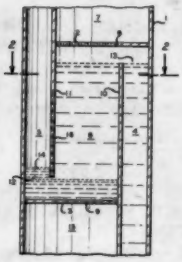
Means for adding fresh dissolvent and for removing liquid containing dissolved solids are provided at the discharge and feed compartment ends of the drum, respectively.

3,730,690

LIQUID-LIQUID CONTACTING MEANS

William C. McCarthy and Merritt V. De Lano, Jr., Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Continuation of application Ser. No. 845,958, July 30, 1969. This application Oct. 18, 1971, Ser. No. 190,286
Int. Cl. B01d *11/04*
U.S. Cl. 23—270.5 9 Claims



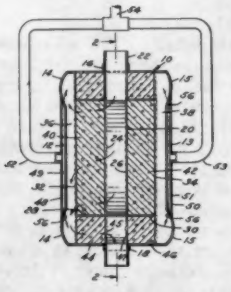
In a mass transfer device of the liquid-liquid extractor type using contacting trays, an improved upcomer conduit providing communication between tray zones is provided with a multiplicity of apertures at its lower extremity.

3,730,691

MULTIPLE BED CATALYTIC CONVERTER

Charles R. Lang, Dearborn, and Donald N. Schock, Flat Rock, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Apr. 26, 1971, Ser. No. 137,350
Int. Cl. F01n *3/14*; B01j *9/04*
U.S. Cl. 23—288 F 14 Claims



Exhaust gases are supplied to the central portion of a cylindrical housing and pass axially through a first catalytic bed that reduces oxides of nitrogen. The gases then flow radially outward in spaces defined by the side walls of the cylindrical housing and finally pass axially inward through a second catalytic bed that oxidizes unburned hydrocarbons and carbon monoxide. Supplemental air is supplied in a manner that promotes good mixing and minimizes backflow.

3,730,692

METHOD FOR REDUCING DUST DURING HANDLING OF REACTIVE FORM COKE BRIQUETTES

Michael O. Holowaty, Crown Point, and Jerome J. Knoerzer, Hammond, Ind., assignors to Inland Steel Company, Chicago, Ill.

No Drawing. Filed May 28, 1971, Ser. No. 148,214
Int. Cl. C10l *9/00, 10/00*
U.S. Cl. 44—6 15 Claims

Briquettes of reactive form coke are treated by applying an aqueous agent containing a lignosulfonate while the briquettes are at an elevated temperature in the range 100–200° F. Aqueous agent may contain an alkaline oxide (CaO or MgO). Briquettes dry while cooling from elevated temperature to form an adherent film of lignosulfonate on briquettes. Alkaline oxide in film is reacted with CO_2 to form a carbonate in film. Film prevents dusting during handling.

3,730,693

HYDROCARBONS AND NONPOLAR SOLVENTS GELLED WITH A LIPOPHILIC POLYMERIC CARBOHYDRATE DERIVATIVE

James Teng, St. Louis County, Mo., Chokun Rha, Southbridge, Mass., and Barry L. Scallet, Clayton, and Marcella C. Stubits, St. Louis, Mo., assignors to Anheuser-Busch, Incorporated, St. Louis, Mo.

No Drawing. Continuation-in-part of applications Ser. No. 845,067, July 25, 1969; Ser. No. 44,640, June 8, 1970; and Ser. No. 106,882, Jan. 15, 1971. This application June 17, 1971, Ser. No. 154,219
Int. Cl. C10l *7/00*
U.S. Cl. 44—7 B 12 Claims

A polymeric carbohydrate derivative such as cellulose laurate or starch laurate with a percentage of substitution between about 40% and about 100% is dispersed or dissolved in jet fuel or other hydrocarbon or nonpolar solvent at a concentration of at least about 0.5 gram solids/100 ml. fluid. The gelled jet fuel is helpful in avoiding fires in aircraft accidents.

3,730,694

FUEL GAS UPGRADING

Donald K. Wunderlich, Richardson, Tex., assignor to Atlantic Richfield Company, New York, N.Y.

Filed Aug. 11, 1971, Ser. No. 170,722
Int. Cl. C01b *2/14*
U.S. Cl. 48—213 6 Claims

A method for upgrading a fuel gas feed by subjecting the feed gas to conditions which convert carbon monoxide to methane, saturate olefins, remove sulfur, and, if necessary, adding or retaining carbon dioxide to react with excess hydrogen present after conversion of the carbon monoxide and saturation of the olefins thereby providing a product gas which has an increased hydrocarbon content and heating value and a reduced sulfur and carbon monoxide content.

3,730,695

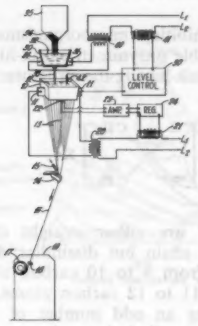
LEVEL CONTROL MEANS FOR GLASS FIBER MAKING PROCESS

Eugene C. Varrasso, Heath, Ohio, assignor to Owens-Corning Fiberglas Corporation

Filed March 23, 1971, Ser. No. 127,268
Int. Cl. C03b *37/02*
U.S. Cl. 65—2 11 Claims

The invention is illustrated in a preferred embodiment for producing glass fibers in which the maintenance of a

preselected head of a molten body of glass is critical in the control of fiber diameter and fiber quality. The feeder contains a molten body of glass and has orifice means formed therein for issuing molten streams of glass. The molten streams of glass are attenuated into glass fibers. A glass melter replenishes the body of molten glass in the feeder as molten glass is withdrawn from the feeder and formed into glass fibers. A probe is disposed for contact with the molten body of glass in the feeder. A source of electrical energy is connected to the probe and the molten body of glass to establish a potential difference between the probe and the molten glass. Current flow in the probe is detected and a detection voltage is supplied proportional to the detected current flow. A bucking voltage is supplied which has a magnitude substantially equal to the magnitude of the detection voltage when the probe is initially touched by the body of molten glass in the feeder. The detection and bucking voltages are compared to provide a level signal which is a measure of the level of the molten body in the feeder. The rate of replenishment of the molten body from the glass melting unit is responsive to the magnitude of the level signal.



3,730,696

METHOD AND APPARATUS FOR GAS PHASE ION INTERCHANGE IN SOLIDS

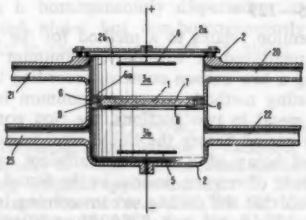
Pierre Pointu and Tran Thach Lan, Paris, France, assignors to Compagnie de Saint-Gobain, Neuilly-sur-Seine, France

Filed Dec. 5, 1968, Ser. No. 781,369

Claims priority, application France, Dec. 5, 1967, 130,982

Int. Cl. C23c *11/00*; C03c *11/00, 21/00*

U.S. Cl. 65—30 **13 Claims**



An electrical field is passed through a solid body carrying with it ions from a gas in contact with the body which displace and replace ions in the body. The process is particularly useful in strengthening and coloring glass by displacing elements such as sodium and replacing them with elements such as potassium and copper.

3,730,697

METHOD FOR SUPPORTING GLASS SHEETS WITH TONGS FOR HEAT TREATING

Samuel L. Seymour, Oakmont, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed March 15, 1971, Ser. No. 124,485

Int. Cl. C03b *27/00*

U.S. Cl. 65—105 **10 Claims**

Marking glass sheets for tong processing.

3,730,698

SEALING OF JOINTS IN REFRACTORY DEVICES WITH SILICATE COATING

Frederick Denys Richardson, Surrey, and Philip Sydney Rogers, Herts, England, assignors to Metallurgic Hoboken-Overpelt, Brussels, Belgium, RST International Metals Limited, London, and Frederick Denys Richardson, Epsom, Surrey, England

No Drawing. Filed Mar. 12, 1971, Ser. No. 123,900

Claims priority, application Luxembourg, Mar. 31, 1970, 60,630

Int. Cl. C03c *27/00, 29/00*

U.S. Cl. 65—43 **16 Claims**

A method for sealing porous refractory joints which comprises applying a silicate glass to a refractory joint, and melting the silicate glass in order to fill the connecting channels between the pores and to block them with the silicate glass. The refractory joint may be obtained from alumina cement.

3,730,699

MACHINE FOR WORKING ARTICLES OF THERMOPLASTIC MATERIALS

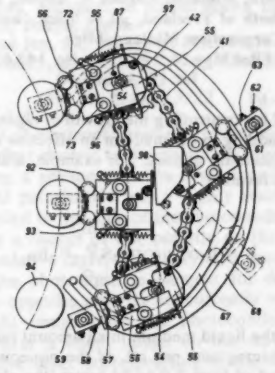
Jakob Dichter, Sachsendamm 93, Berlin, Germany

Continuation of application Ser. No. 686,181, Nov. 28, 1967. This application Oct. 27, 1970, Ser. No. 84,548

Claims priority, application Germany, Nov. 29, 1966, D 51,665

Int. Cl. C03b *9/00*

U.S. Cl. 65—237 **8 Claims**



A machine for working thermoplastic articles having a carriage for carrying the articles to be worked and an

endless conveyor on which tools may be carried, each tool being arranged to work over a working path, for a respective article as it is conveyed on the carriage. The working path may be arranged to be longer than the spacing between the articles.

3,730,700

PROCESS FOR THE PRODUCTION OF AMMONIUM PHOSPHATE FERTILIZERS

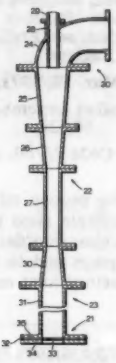
Pieter Groenveld, Rijswijk, Netherlands, assignor to Cominco Ltd., Trail, British Columbia, Canada

Filed July 6, 1970, Ser. No. 52,613

Claims priority, application Canada, July 7, 1969, 56,313

Int. Cl. C05b *7/00*

U.S. Cl. 71—34 **6 Claims**



A process and apparatus for the production of ammonium phosphate fertilizer material in which gaseous anhydrous ammonia and phosphoric acid are reacted under pressure in a confined, elongated reaction zone under high velocity condition to prevent the deposition of solid reaction products within the reaction zone.

3,730,701

METHOD FOR CONTROLLING THE GROWTH OF ALGAE IN AN AQUEOUS MEDIUM

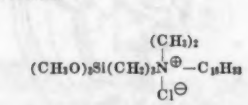
Alan J. Isquith, Midland; Eugene A. Abbott, and Patrick A. Walters, both of Freeland, all of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed May 14, 1971, Ser. No. 143,650

Int. Cl. A01n *9/00*

U.S. Cl. 71—67 **8 Claims**

A method for controlling the growth of algae in an aqueous medium by adding to the medium an effective amount of certain silyl quaternary amines. For example, a silyl quaternary amine of the formula



is added to the liquid medium in an amount ranging from 1.0 to 10,000 micrograms per ml. of the aqueous medium and after a period of from 2.0 to 24 hours, the algae are flocculated without rendering the aqueous medium toxic to humans, animals and fish.

3,730,702

BIOCIDAL UNSYMMETRICAL DI-HIGHER ALKYL DIMETHYL AMMONIUM COMPOUNDS

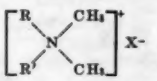
Edward G. Shay, Belle Mead, N.J., Reginald L. Wakeman, Philadelphia, Pa., and Alphonso N. Petrocci, Glen Rock, N.J., asisgnors to Millmaster Onyx Corporation, New York, N.Y.

No Drawing. Continuation-in-part of abandoned application Ser. No. 782,439, Dec. 9, 1968. This application June 9, 1971, Ser. No. 151,583

Int. Cl. A01n *9/20*

U.S. Cl. 71—67 **1 Claim**

A method of inhibiting microorganisms by applying thereto a water-soluble unsymmetrical di-higher alkyl dimethyl ammonium salt having the structure:



wherein R and R′ are either straight chain or predominantly straight chain but dissimilar alkyls, one of said alkyls having from 9 to 10 carbon atoms and the other having from 11 to 12 carbon atoms, at least one of the alkyls having an odd number of carbons, and the total sum of both alkyls being between 20 and 21; and wherein X is a biocidally acceptable anion preferably derived from a halogen such as bromine or chlorine, or which may be methosulfate.

3,730,703

HARVESTING AID

Raymond H. Daehnert, Tustin, Calif., assignor to Allied Chemical Corporation, New York, N.Y.

Filed June 16, 1966, Ser. No. 557,928

Int. Cl. A01n *11/00*

U.S. Cl. 71—69 **10 Claims**

Chemical desiccation and defoliation of crop bearing plants, e.g., cotton, may be effected by treatment of the plant with an effective amount of ammonium thiosulfate.

3,730,704

METHOD FOR THE PRODUCTION OF KILLED, UNALLOYED OR LOW-ALLOY, ALUMINUM CONTAINING STEEL WITH LOW CARBON CONTENT

Thorwald Fastner and Gerhard Papp, Linz, Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke Aktiengesellschaft, Linz, Austria

No Drawing. Filed Jan. 26, 1970, Ser. No. 5,912

Claims priority, application Austria, Jan. 28, 1969, A 826/69

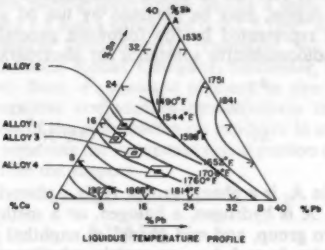
Int. Cl. C22c *39/02*

U.S. Cl. 75—129 **3 Claims**

The invention relates to a method for the production of killed, unalloyed or low-alloy, aluminum containing steel having a low carbon content, according to the continuous casting method, wherein aluminum is added to the liquid metal in two portions, the first portion being added at a period before the liquid steel is cast into the tundish and being of a quantity sufficient to bind the major amount of oxygen present in the liquid steel, with the provision that the casting stream coming into contact with air contains only between 0.005 and 0.01% of metallic aluminum, and the second portion being added at a stage when the casting stream will no longer get into contact with the atmosphere and being of a quantity sufficient to obtain the desired analysis. According to the invention

a material is obtained whose surface is largely free from aluminum oxides and thus is suitable for deep-drawing purposes.

3,730,705
METHOD OF MAKING LEADED-TIN BRONZE ALLOYS
Charles H. Latrobe, Baltimore, Md., assignor to Koppers Company, Inc., Pittsburgh, Pa.
Filed Mar. 1, 1971, Ser. No. 119,599
Int. Cl. C22c *9/02*
U.S. Cl. 75—156 **5 Claims**



A method for making a leaded-tin bronze alloy of a predetermined composition comprises heating metal scrap to make a liquid alloy thereof, measuring and recording the temperature of a sample of the alloy while the sample cools to a solid, whereby the thermal liquidus and monotectic arrest temperatures of the alloy are determined, and adding sufficient quantities of copper, tin or lead to the molten alloy to obtain a desired thermal liquidus and monotectic arrest temperatures and accordingly the desired predetermined composition of the alloy.

This method is useful in controlling the composition of leaded-tin bronze alloys without using conventional analytical techniques.

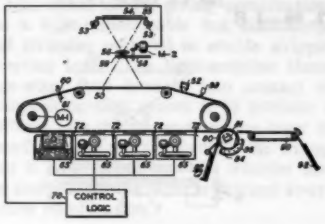
3,730,706
STRENGTHENED CATHODE MATERIAL AND METHOD OF MAKING
William E. Buescher and Donald R. Kerstetter, Emporium, Pa., assignors to GTE Sylvania Incorporated, Seneca Falls, N.Y.
Filed June 29, 1970, Ser. No. 50,843
Int. Cl. B22f *1/00*
U.S. Cl. 75—206 **4 Claims**

A cathode material containing discrete islands of thoria enriched nickel particles is disclosed, as well as a method for fabricating the same. Powder metal techniques are utilized and the material comprises a major amount of substantially pure nickel and a minor amount of a composite material. The composite material comprises composite particles of co-treated nickel and thoria. The thoria is homogeneously dispersed with respect to its co-treated nickel but non-homogeneously dispersed with respect to the remainder of the nickel.

3,730,707
METHOD OF DEVELOPING LATENT IMAGES
Robert J. Hagenbach and Myron J. Lenhard, Rochester, N.Y., assignors to Xerox Corporation, Rochester, N.Y.
No Drawing. Original application Apr. 17, 1967, Ser. No. 631,193, now Patent No. 3,595,794. Divided and this application Nov. 30, 1970, Ser. No. 93,904
Int. Cl. G03g *9/02, 13/08*
U.S. Cl. 96—1 SD **3 Claims**

A xerographic carrier bead material for use in developing electrostatic latent images comprising a glass composition of from about 5 to about 45 parts oxides of silicon and from about 20 parts to about 95 parts oxides of lead.

3,730,708
ELECTROPHOTOGRAPHIC MULTI-COLOR PROCESS EMPLOYING LIQUID DEVELOPER
Don B. Jugle, Penfield, N.Y., assignor to Xerox Corporation, Rochester, N.Y.
Original application Feb. 8, 1968, Ser. No. 703,985, now Patent No. 3,627,410. Divided and this application Mar. 15, 1971, Ser. No. 124,603
Int. Cl. G03g *13/22*
U.S. Cl. 96—1.2 **2 Claims**



Apparatus for developing latent electrostatic images with a liquid developer by forming a wave to contact the image with sufficient turbulence, such that developer particles are suspended uniformly, but gentle enough so as not to destroy the electrical characteristics of the image thereby rendering a high quality print. The wave is formed by pumping liquid developer from a sump pit into a header pipe which is immersed below the surface of a development tray filled with liquid developer. Pressurized gas is introduced into the sump means to maintain uniform suspension of the particles in the developer liquid. In a preferred embodiment, an array of liquid development units of different colors are positioned at a development station to produce multi-color prints by selectively controlling the formation of different waves to contact latent images formed sequentially on a photoreceptor member advanced past the developing units. The liquid developed images are then transferred onto a support sheet in superposed relationship.

3,730,709
METHOD FOR ELECTROPHOTOGRAPHY
Koichi Kinoshita, Narashino, and Masanori Watanabe, Tokyo, Japan, assignors to Katsuragawa Denki Kabushiki Kaisha, Tokyo, Japan
Filed Jan. 22, 1971, Ser. No. 108,733
Claims priority, application Japan, Jan. 24, 1970, 45/6,603
Int. Cl. G03g *13/22*
U.S. Cl. 96—1.4 **6 Claims**

In a method of electrophotography comprising the steps of applying a first electric field across a photosensitive element including a photoconductive layer manifesting persisting internal polarization and a highly insulative layer integrally bonded to one side of the photoconductive layer for depositing a charge of one polarity on the surface of the highly insulative layer, and applying a second electric field across the photosensitive element for depositing a charge of the opposite polarity concurrently with projection of a light image upon the photoconductive layer whereby to form a latent image on the surface of the highly insulative layer corresponding to the light image, a third electric field is applied across the photosensitive element for depositing a charge of the same polarity as

the charge deposited by the second electric field for improving the contrast and then the latent image is developed to provide a visible image.

3,730,710

ELECTROSTATIC IMAGING EMPLOYING A DOT ELECTRODE

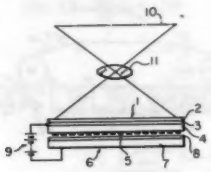
Wasaburo Ohta, Yokohama, Japan, assignor to Kabushiki Kaisha Ricoh, Tokyo, Japan

Filed July 13, 1970, Ser. No. 54,239

Claims priority, application Japan, July 11, 1969, 44/55,225

Int. Cl. G03g *13/22*

U.S. Cl. 96—1 R **2 Claims**



An electrostatic image recording method is provided. For preparing a photoreceptor, a transparent electrode is mounted on a transparent support, a photoconductor layer is laid on said electrode and a plurality of separate dot electrodes are further provided on said photoconductor layer. A recorder having an insulating layer on an electrode is positioned so that said dot electrodes of said photoreceptor and said insulating layer of said recorder may be faced with each other. A potential is applied to said transparent electrode of said photoreceptor and said electrode of said recorder, and under this potential applying condition, they are exposed to light, whereby a charged image is formed on said recorder.

3,730,711

PHOTOCONDUCTIVE MATERIAL FOR ELECTROPHOTOGRAPHY

Hisatake Ono and Syu Watarai, Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

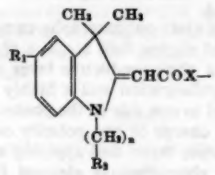
No Drawing. Filed Aug. 13, 1970, Ser. No. 63,619

Claims priority, application Japan, Aug. 13, 1969, 44/64,037

Int. Cl. G03g *5/06*

U.S. Cl. 96—1.5 **8 Claims**

A photoconductive material for electrophotography which consists essentially of an indoline derivative having a radical represented by the following Formula I:



(I)

wherein R_1 represents a hydrogen, a halogen atom, a lower alkyl —NO_2, —OR or —COOR group (R being a lower alkyl group); R_2 represents H, —OR_3, —CN or a phenyl group (R_3 being H or a lower alkyl group); *n* is an integer having the value of 1–4; X represents either a single bond or —NH— group.

3,730,712

PHOTOCONDUCTIVE MATERIAL FOR ELECTROGRAPHY

Kiyoshi Futaki, Kazuhiro Emoto, and Hirokazu Tsukahara, Kyoto, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

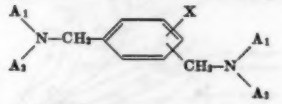
No Drawing. Filed Mar. 1, 1971, Ser. No. 119,886

Claims priority, application Japan, Mar. 3, 1970, 45/17,645

Int. Cl. G03g *5/04, 5/06*

U.S. Cl. 96—1.5 **6 Claims**

An excellent photosensitive material, which has a high sensitivity and has no strong absorption in the near ultraviolet region, may be obtained by use of a novel compound represented by the following general formula as the photoconductive substance for electrography:



wherein A_1 is a phenyl group, A_2 is a phenyl or naphthyl group, X is hydrogen, a halogen, or a methyl, methoxy, or nitro group, and said phenyl or naphthyl group represented by A_1 and A_2 may contain substituents. The compound is readily synthesized and also has a high solubility in solvents.

3,730,713

DEVELOPER SCAVENGERS FOR IMAGE TRANSFER SYSTEMS

Thomas I. Abbott, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

No Drawing. Filed May 26, 1971, Ser. No. 147,166

Int. Cl. G03c *5/54, 7/00*

U.S. Cl. 96—3 **18 Claims**

A developer scavenger layer comprising a bis(vinylsulfonylalkyl) derivative in a polymeric binder is useful for reducing background stain in a dye image-receiving element of a color diffusion transfer system utilizing immobile couplers which form diffusible dyes.

3,730,714

PHOTORESPONSIVE ARTICLES COMPRISING MULTILAYER SPECTRAL SENSITIZATION SYSTEMS

George R. Bird, Princeton, N.J., and Alan E. Rosenoff, Carlisle, Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of application Ser. No. 804,254, Mar. 14, 1969, which is a continuation-in-part of application Ser. No. 401,677, Oct. 5, 1964. This application Nov. 4, 1971, Ser. No. 195,779

Int. Cl. G03g *5/08;* G03c *1/28*

U.S. Cl. 96—1.7 **15 Claims**

Photoresponse of a given photosensitive medium is enhanced by utilizing a spectral sensitization system which comprises a layer of a cyanine spectral sensitizing dye adsorbed to said photosensitive medium and, superposed thereover, at least one layer of an energy absorbing and transmitting material which possesses a higher intrinsic energy absorption frequency than the energy absorption frequency of the immediately preceding layer, and an intrinsic energy transmitting frequency which overlaps the energy absorption frequency of the next preceding layer, thereby providing a radiationless circuit capable of transmitting photon-excitation-derived energy to said photosensitive medium.

3,730,715

PROCESS FOR FORMING SILVERLESS CONTINUOUS TONE PHOTOGRAPHIC IMAGE WITH POLYTHIOL POLYMERS

Arthur Donald Ketley, Columbia, Clifton Leroy Kehr, Silver Spring, and Jennie Lee Touchette, Columbia, Md., assignors to W. R. Grace & Co., New York, N.Y.

No Drawing. Original application Oct. 11, 1968, Ser. No. 766,948. Divided and this application July 15, 1971, Ser. No. 163,078

Int. Cl. G03c *1/68, 5/00*

U.S. Cl. 96—35.1 11 Claims

This invention is directed toward forming a silverless continuous tone photographic image having a scale index between 0.5 and 1.5 and a gamma of 0.5–1.5 (see "Kodak Notes on Practical Densitometry," Pamphlet No. E59, pages 1–17, Eastman Kodak Company, Rochester, N.Y., for definitions) from a supported pigment or dye filled liquid photosensitive composition by selectively insolubilizing portions of the composition on exposure to actinic radiation and removing the unexposed liquid portion of the composition from the support.

3,730,716

SILVER IMAGE STABILIZATION WITH NOBLE METAL COMPOUNDS AND α,β-ENEDIOL DEVELOPER

Edwin H. Land, Cambridge, Stanley M. Bloom, Waban, and Leonard C. Farney, Melrose, Mass., assignors to Polaroid Corporation, Cambridge, Mass.

No Drawing. Filed May 19, 1971, Ser. No. 145,044

The portion of the term of the patent subsequent to Nov. 28, 1989 has been disclaimed

Int. Cl. G03c *5/54*

U.S. Cl. 96—29 R 17 Claims

The present invention relates to a novel photographic film unit adapted to provide silver images of enhanced image stability which comprises photosensitive silver halide, a noble metal compound containing a noble metal ion below silver in the Electromotive Force Series of Elements, and a silver halide developing agent whose oxidation product is substantially nonoxidative to the thus-formed silver image for a time sufficient to enable the noble metal ion to contact said silver image to provide sustained and long-lasting stabilization effects.

3,730,717

PHOTOHARDENABLE ELEMENT WITH LIGHT-DEVELOPABLE DIRECT WRITING SILVER HALIDE OVERCOATING

Victor Fu Hua Chu, Wilmington, Del., and Abraham Bernard Cohen, Springfield, N.J., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

No Drawing. Filed Mar. 28, 1969, Ser. No. 811,608

Int. Cl. G03c *5/04, 1/68, 11/12*

U.S. Cl. 96—27 R 10 Claims

An element comprising a light-hardenable layer upon which is coated a photodevelopable colloid silver halide emulsion. The photodevelopable silver halide emulsion is exposed, photodeveloped, and the image used as a negative to expose the underlying composition which is treated to remove the composition in unexposed, but not in exposed area. Printing reliefs suitable for letterpress and offset printing and printed circuits can be made from the elements of the invention, using wash-off procedures or thermal transfer means whereby unhardened image areas adhere to a previously or subsequently applied receptor sheet or plate.

3,730,718

PHOTOGRAPHIC DYE DIFFUSION TRANSFER PROCESS

Justus Danhauser, Cologne, Germany, assignor to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

No Drawing. Filed Sept. 29, 1971, Ser. No. 184,936

Claims priority, application Germany, Oct. 9, 1970, P 20 49 688.2

Int. Cl. G03c *5/54, 7/00, 1/90*

U.S. Cl. 96—29 D 6 Claims

For the production of a colored image by the dye diffusion transfer process a multilayer material is used which contains an image-receiving layer on a transparent support, and a light-sensitive, dye-giving combination, and between them a light-impermeable but diffusion-permeable layer and stripping material to enable stripping off the image-receiving layer. The light-sensitive element is exposed image-wise, then brought into contact with a processing composition that causes it to produce a dye image that diffuses into the image-receiving layer therein forming a transfer image visible through the transparent support. When it is observed that the transfer image is acceptable the image-receiving layer is stripped away from the light-sensitive combination.

3,730,719

METHOD AND ARTICLE FOR COLOR KINESCOPE SCREEN AND MASK PRODUCTION

Harold Bell Law, Princeton, N.J., assignor to RCA Corporation

Continuation of abandoned application Ser. No. 834,759, June 19, 1969. This application June 15, 1971, Ser. No. 153,419

Int. Cl. G03c *5/00*

U.S. Cl. 96—36.1 2 Claims

A method for producing a color kinescope having an image screen including a plurality of phosphor areas and a color selection barrier prepared from a preliminary mask used for screen printing. The preliminary mask is made by disposing an apertured layer of a second metal on one surface of a substrate of a first metal, disposing a perforated resist film on another such surface, etching portions of the substrate therebetween to provide apertures larger than those of the metal layer, and removing the resist film. The preliminary mask is used for printing the phosphor areas and the apertured metal layer removed to produce a color selection barrier. The preliminary mask may be used to provide a dark matrix to the image screen.

3,730,720

FABRICATION OF INTEGRATED OPTICAL CIRCUITS

John David Cuthbert, Bethlehem, Pa., Donald Henry Hensler, Morris, N.J., and William Harold Orr, Carmel, Ind., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill and Berkeley Heights, N.J.

Filed Aug. 5, 1970, Ser. No. 61,067

Int. Cl. G03c *5/00*

U.S. Cl. 96—38.3 10 Claims

In this disclosure a process is described for the fabrication of optical integrated circuits. The process consists of forming a film of a metal or alloy on a substrate, removing part of the film by photolithographic techniques so as to form the desired pattern, and then oxidizing this film to the corresponding metal oxide. The metal oxide film on the substrate forms the optical integrated circuit. An advantage of this process is that photolithographic techniques can be used to produce quite complicated patterns of small dimensions.

3,730,721

PHOTOGRAPHIC INTENSIFICATION PROCESS AND COMPOSITION

John Williams and Paul Gilman, Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

No Drawing. Filed Oct. 22, 1965, Ser. No. 502,389

Int. Cl. G03c 5/24, 5/26, 5/32

U.S. Cl. 96—48 PD 32 Claims

A physical developer for latent images in silver sensitized photographic materials comprises a cupric salt and a reducing agent such as ascorbic acid for this cupric salt. A silver salt solvent transfer developer also contains a silver halide solvent. Latent image nuclei are physically developed or intensified by the cupric salt physical developer.

3,730,722

YELLOW COUPLER AND ITS USE

Isaburo Inoue, Takaya Endo, Syunji Matsuo, Masahiko Taguchi, and Toshihiko Yamamoto, Tokyo, Japan, assignors to Konishiroku Photo Industry Co., Ltd.

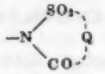
Filed Nov. 20, 1970, Ser. No. 91,404

Claims priority, application Japan, Nov. 26, 1969, 44/94,274

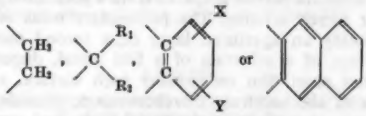
Int. Cl. G03c 7/00

U.S. Cl. 96—56.3 1 Claim

A coupler capable of forming a yellow color image in color photography has an open chain active methylene group bonded to two adjacent carbonyl groups. One of the hydrogen atoms of the active methylene is substituted by a group of the formula



wherein Q is



R_1 and R_2 are lower alkyl, X is hydrogen, halogen or alkoxy, and Y is hydrogen, halogen, amino, acylamide, ureide, lower alkyl, alkoxy or hydroxy. A method is disclosed for forming a yellow color image on a light sensitive color photographic material using this coupler. The developed yellow color image exhibits excellent light and humidity fastness.

3,730,723

DIRECT POSITIVE PROCESSES UTILIZING SILVER HALIDE SURFACE IMAGE EMULSIONS CONTAINING DESENSITIZERS

Paul Brewster Gilman, Jr., Rochester, Ronald George Raleigh, Brockport, and Thaddeus Donald Koszelak, Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

No Drawing. Filed June 17, 1971, Ser. No. 154,224

Int. Cl. G03c 1/36, 15/24

U.S. Cl. 96—64 17 Claims

Improved processes are disclosed for obtaining positive images in an unfogged, silver halide emulsion wherein a photographic element comprising a support and said emulsion are imagewise-exposed and then either (1) developed in a silver halide developer in the presence of a silver halide fogging agent or (2) given a light flash during development in a silver halide developer. In one aspect, the silver halide emulsions of this invention are surface-image emulsions comprising an electron acceptor and/or desensitizing concentrations of spectral-sensitizing dye and the grains of said emulsion have been chemically sensitized on the surface thereof to a level less than that which would provide a substantial density in Kodak Developer DK–50 after an imagewise exposure when said emulsions are coated at a coverage of between 300 to 400 mg. of silver per $ft.^2$.

3,730,724

SILVER HALIDE COLOR PHOTOGRAPHIC ELEMENT CONTAINING A MAGENTA COLOR COUPLER AND A CARBOXY SUBSTITUTED THIAZOLINE COMPOUND

Thomas Irving Abbott, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

No Drawing. Continuation-in-part of abandoned application Ser. No. 21,468, Mar. 20, 1970. This application June 3, 1971, Ser. No. 149,815

Int. Cl. G03c 1/28, 1/76, 1/34

U.S. Cl. 96—74 10 Claims

Light sensitive photographic elements comprising surface sensitized converted-halide silver halide grains are contained in emulsions which are particularly and effectively stabilized by addenda which resist pre-processing deterioration, post-processing dye stability and unwanted shifting in color balance. Preferred such addenda are carboxy substituted thiazolinethione and carboxy substituted thiazolidines.

3,730,725

ADDITIVE COLOR SCREEN ELEMENTS CONTAINING AN AZO CHROME-COMPLEXED DYE

Elbert M. Idelson, Newton Lower Falls, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

No Drawing. Continuation-in-part of abandoned application Ser. No. 873,131, Oct. 31, 1969. This application Sept. 30, 1971, Ser. No. 185,403

Int. Cl. G03f 5/00, 7/04

U.S. Cl. 96—81 12 Claims

Additive color screen elements are prepared using a mixed-azo chrome-complexed dye system to provide the red element, i.e., a combination of a phenylazo pyrazolone and a naphthylazo pyrazolone.

3,730,726

COLOR PHOTOGRAPHIC LIGHT-SENSITIVE ELEMENTS

Nobuo Tsuji, Yoshiaki Ono, Fumihiko Nishio, and Hirozo Ueda, Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Minami Ashigara-shi, Kanagawa, Japan

No Drawing. Continuation-in-part of abandoned application Ser. No. 717,420, Mar. 29, 1968. This application Sept. 14, 1970, Ser. No. 72,116

Claims priority, application Japan, Mar. 29, 1967, 42/19,696, 42/19,697, 42/19,698

Int. Cl. G03c 1/04

U.S. Cl. 96—84 R 11 Claims

By incorporating a copolymer of vinyl alcohol and vinyl pyrrolidone, a partially saponificated polyvinyl alcohol, or a copolymer of vinyl alcohol and cyanoethyl-vinyl ether or a copolymer of vinyl alcohol and alkyl-vinyl ether in a photographic layer of a color photographic light-sensitive element, in particular, a color photographic silver halide emulsion having incorporated therein an oil-soluble coupler and an oily solvent having a high boiling point, the silver removal or silver bleaching of developed silver in bleaching process after color de-

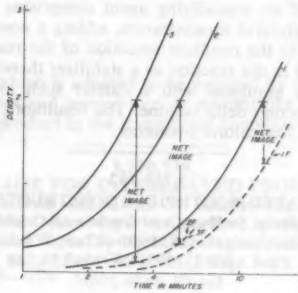
velopment is effectively improved whereby the color turbidity of colored images can be reduced.

3,730,727

PHOTOGRAPHIC ELEMENT COMPRISING AN ALIPHATIC CARBOXYLIC ACID ARYL HYDRAZIDE AND ASCORBIC ACID

Ismael Adolfo Olivares, Frederic Roland Bean, and Grant Milford Haist, Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 11, 1971, Ser. No. 123,317
Int. Cl. G03c *1/06, 1/76, 5/30*
U.S. Cl. 96—95 **6 Claims**



Aryl, heterocyclic or aliphatic carboxylic acid aryl hydrazides are employed with ascorbic acid as a developing agent combination for exposed electromagnetic energy sensitive silver salts. The developing agent combination can be employed in developer solutions, in silver salt processing solutions, as an incorporated developing agent combination, as a developing agent combination in diffusion transfer processes and in dry processing techniques. The combination can be located in the same or different layers of a photographic element, or the hydrazide can be located in the photosensitive emulsion layer and the ascorbic acid located in an activator solution. The process of developing exposed photographic elements in the presence of the hydrazides and ascorbic acid is disclosed.

3,730,728

ANIMAL FOOD FROM RAW WHOLE FISH

Max Patashnik, Kirkland, and Mark C. Keyes, Kent, Wash., assignors to the United States of America as represented by the Secretary of the Interior

No Drawing. Filed Nov. 18, 1970, Ser. No. 90,805
Int. Cl. A22c *25/20;* **A23k** *1/10*
U.S. Cl. 99—3 **1 Claim**

Raw whole fish is coarsely ground to hamburger-like consistency while kelp and NaCl are added to the fish, the latter to salinize its aqueous content so as to solubilize myofibrillar protein in the fish. The "hamburger" is then passed through a colloid mill to form a paste-like emulsion containing dissolved protein, dispersed globules of fish fat, and dispersed particles of kelp. Dissolved protein is then coagulated to gel the emulsion into a product suitable as animal food or bait.

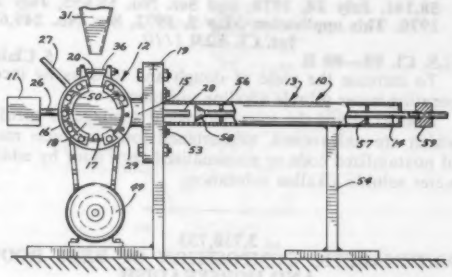
3,730,729

CONTINUOUSLY PUFFING FINELY-DIVIDED PARTICULATE FOOD MATERIALS UTILIZING OPPOSING STEAM FORCES

Palmer K. Strommer, Osseo, Minn., assignor to General Mills, Inc.

Filed July 27, 1970, Ser. No. 58,318
Int. Cl. A23g *1/04;* **A23l** *1/10, 1/12*
U.S. Cl. 99—26 **22 Claims**

Heat and pressure reactive particulate food materials such as cereal flour, cocoa powder, potato flour, or finely-divided protein containing materials are treated in an apparatus wherein the food material is propelled through a treatment zone containing steam at a pressure of between about 15 p.s.i.g. and 110 p.s.i.g. by a steam flow which itself is at a pressure of at least 15 p.s.i.g. and a temperature of between 250° F. and 500° F. Once the food material passes through the treatment zone it is then



carried into a zone of lower pressure. The opposing forces on the food material from the flow of steam and the steam pressure in the treatment zone result in the material being either puffed, texturized, gelatinized, homogenized or agglomerated.

3,730,730

STABLE AND EMULSIFIABLE HOP EXTRACT

Francis Lloyd Rigby, Yakima, Wash., assignor to John I. Haas Inc., Washington, D.C.

No Drawing. Filed Nov. 23, 1970, Ser. No. 92,267
Int. Cl. C12c *9/02*
U.S. Cl. 99—50.5 **1 Claim**

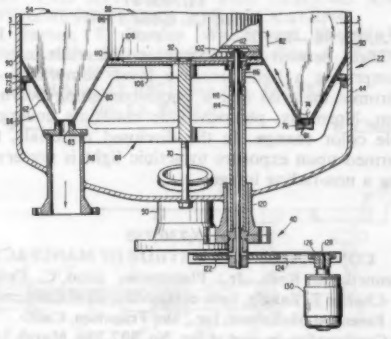
A hop extract composition comprises a resinous phase of the resinous constituents of hops, an aqueous phase of a syrup selected from the group consisting of (1) a syrup of hop water-solubles and (2) a sugar syrup, and a colloid stabilizing agent present in amounts sufficient to inhibit stratification of said phases during storage of said composition at a temperature up to 100° F.

3,730,731

ROASTING METHOD FOR PARTICULATE SOLIDS

Horace L. Smith, Jr., Richmond, Va., assignor to Smitherm Industries, Inc., Richmond, Va.

Continuation-in-part of Ser. No. 44,464, June 8, 1970, Pat. No. 3,615,668. This application April 26, 1971, Ser. No. 137,247
Int. Cl. A23l *1/02*
U.S. Cl. 99—68 **7 Claims**



A method for roasting particulate solids which includes a system for heating and circulating a fluid through a roasting vessel, and arrangements for supplying material to be processed to and discharging it from the reactor.

3,730,732
TORTILLA AND PROCESS USING WATER SOLUBLE ALKALINE SUBSTANCE

Manuel Jesus Rubio, Bridgeport, Conn., assignor to Roberto Gonzalez Barrera, Victor Hermosa, Monterrey, Mexico

No Drawing. Continuation-in-part of applications Ser. No. 58,141, July 24, 1970, and Ser. No. 58,655, July 27, 1970. This application May 2, 1972, Ser. No. 249,624
Int. Cl. A23l *1/10*
U.S. Cl. 99—80 R **5 Claims**

To increase the yield of dough and tortillas by incorporating water soluble alkaline substances.

Also to retard the microbiological spoilage of tortillas which are unleavened, unshortened food products made of noxtamlized corn or nixtamalized corn flour by adding water soluble alkaline substances.

3,730,733
ANTIDIABETIC COMPOSITION OF BEET ROOTS AND HORSERADISH

Josef Vujcuf, 42 Schusselbergstrasse 8, Munich, Germany

No Drawing. Filed Jan. 12, 1971, Ser. No. 105,943
Claims priority, application Germany, Dec. 24, 1970, P 20 63 845.3
Int. Cl. A23l *1/00*
U.S. Cl. 99—100 **5 Claims**

An antidiabetic vegetable composition which is composed of red beet-roots and, per 100 parts by weight thereof, of 10 to 25 parts by weight, preferably 12 to 20 parts by weight of horse-radish, about 3 to about 15 parts by weight of a vegetable oil; preferably of high unsaturation, and from about 3 to about 16 parts by weight of vinegar, preferably apple or pear vinegar of about 5% concentration, and up to 5% by weight, based on the composition, of other taste modifying agents and/or food preservatives, preferably 2 to 6 parts by weight of wine per 100 parts by weight of beet-roots, said composition having surprisingly antidiabetic and some diuretic effects but convenient taste, especially if made up like a salad. The composition is stable more than a year if pasteurized at 75 to 90° C. and sealed air-tight without any preservatives added.

3,730,734
LIGHT-SENSITIVE PHOTOPOLYMERIZABLE MATERIAL CONTAINING PHOTOCHROMIC MATERIAL

Gerhard Albert Delzenne, 's-Gravenwezel, Belgium, assignor to Gevaert-Agfa N.V., Mortsel, Belgium

No Drawing. Filed Mar. 12, 1968, Ser. No. 712,362
Claims priority, application Great Britain, Mar. 13, 1967, 11,703/67
Int. Cl. G03c *1/68*
U.S. Cl. 96—115 R **17 Claims**

Light sensitive photographic materials are provided comprising a light sensitive layer comprising a photochromic material and a photo-hardening polymeric system. Normally, photochromic materials undergo reversible color change. In the disclosed materials, the color formed upon exposure to actinic light is preserved forming a non-fading image.

3,730,735
CONFECTION AND METHOD OF MANUFACTURE

Kenneth E. Rash, Jr., Pleasanton; John C. Colmey, and Charles E. Zanzig, both of Danville, all of Calif., assignors to Foremost-McKesson, Inc., San Francisco, Calif.

Continuation-in-part of Ser. No. 807,280, March 14, 1969, abandoned. This application Feb. 23, 1971, Ser. No. 118,045
Int. Cl. A23g *3/00*
U.S. Cl. 99—134 R **6 Claims**

Confection or candy mixes and products having relatively high levels of solubilized protein obtained by using partially delactosed and partially demineralized whey having an ash content of not more than about 6.5 percent in combination with a soluble caseinate.

3,730,736
LOW CALORIE SWEETENER

Alfred R. Globus, Bayside, N.Y., assignor to Farah Manufacturing Co., Inc., El Paso, Tex., and Guardian Chemical Corporation, Hauppage, Long Island, N.Y.

No Drawing. Filed June 12, 1970, Ser. No. 45,925
Int. Cl. A23l *1/26*
U.S. Cl. 99—141 A **7 Claims**

Low calorie sweetener prepared by the steps of reacting a metal salt of saccharin with a non-toxic acid in the presence of an emulsifying agent comprising water, glycerin and glycerol monostearate, adding a non-toxic polyphosphate to the resultant emulsion of the reaction product formed in the reaction as a stabilizer therefor, and admixing the emulsion with a carrier such as an amino acid or glucono delta lactone. The resultant powder constitutes the low calorie sweetener.

3,730,737
COATED MOUTHPIECE CONSTRUCTION

Robert J. Harvey, Sudbury, and Gurbuz Ali Celebi, Marlboro, both of Mass., assignors to Meditron Inc., Wayland, Mass.

Filed April 1, 1971, Ser. No. 130,248
Int. Cl. B65b *29/06*
U.S. Cl. 99—171 B **28 Claims**

A mouthpiece construction having a tip and a mouthpiece adapted to fit with a straw. The tip is coated with an effervescent taste-modifying composition comprising an effective amount of room temperature stable taste modifying principle known as miraculin obtained from the ripe fruit of *Synsepalum dulcificum* Daniell, and a non-toxic alkaline material capable of forming carbon dioxide when dissolved in an aqueous acidic solution. The coating is sealed from the atmosphere and the interior of the mouthpiece. The mouthpiece has a lengthwise passageway which fits with the interior of a straw and radial passageway which connects the lengthwise passageway and the peripheral surface of the mouthpiece. The radial passageways are positioned so that liquid passing out of them contacts the coating.

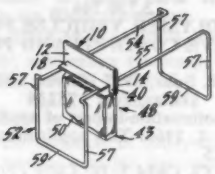
3,730,738
PACKAGE AND DISPLAY SYSTEM THEREFOR

Russell John Cook, Appleton, Donald Roy Kuehl, Menasha, and David Charles Mueller, Neenah, Wis., assignors to American Can Company, Greenwich, Conn.

Filed Mar. 22, 1971, Ser. No. 126,640
Int. Cl. B65b *25/00*
U.S. Cl. 99—174 **5 Claims**

A header for a package adapted to hang suspended between a pair of spaced horizontal support members in a display case, the header having front and back panels connected at a fold line and folded for receiving an upper end portion of a transparent container to be supported thereby. The header has portions extending be-

yond the sides of the container and which have recesses for receiving the support members, and a hinged panel



extension which is adapted to be engaged by the supporting members and moved into an awning-like position to shield the product in the transparent container from light.

3,730,739

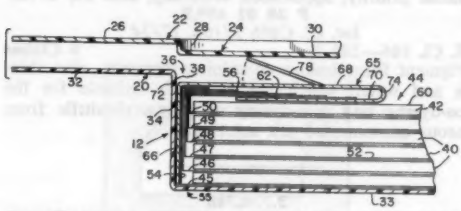
PACKAGE FOR INTERLEAVED PRODUCTS

Oscar E. Seiferth and Glenn M. Austin, Madison, Wis., assignors to Oscar Mayer & Co., Inc., Madison, Wis.

Filed Sept. 29, 1971, Ser. No. 184,664

Int. Cl. B65b *25/08*

U.S. Cl. 99—174 **4 Claims**



A package for convenient separation and removal of any desirable number of stacked articles, such as slices of sausage or cheese, which are of such a nature that it is necessary or desirable to separate respective, stacked articles by interleaf sheets. Uniformly sized interleaf sheets extend from between respective adjacent articles from one edge of the stack, and are folded upward along the edge of the stack to provide shingled exposed margins of the individual sheets at the top of the package. The free ends of the interleaf sheets are folded down across the top surface of the top article in the stack and are separated from the top surface of the stack for easy separation from the top article.

3,730,740

SHAPED AND FORMED MEAT PRODUCTS MANUFACTURE

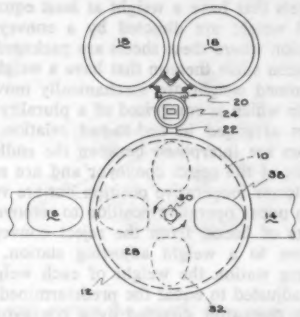
Warren R. Schack, Western Springs, and Francis Glenn Connick, Downers Grove, Ill., assignors to Swift & Company, Chicago, Ill.

Filed May 10, 1971, Ser. No. 141,492

Int. Cl. A22c *18/00*; A23b *1/00*

U.S. Cl. 99—187 **5 Claims**

Method and apparatus for rapid and accurate filling of meat containers with solid meat pieces having the muscle fibers thereof arranged in substantial parallel alignment with the longest dimension of the meat container to produce an improved appearance and melding of the meat surfaces into a superior unitary product. The solid meat pieces are passed under a constant positive pressure through a side wall of volumetric forming chamber along a horizontal plane and in the direction of the longitudinal axis



thereof and thereafter the formed product is transferred intact to an identically shaped container.

3,730,741

METHOD FOR REMOVING EXCESS MOISTURE FROM WATER-BATH CHILLED POULTRY CARCASSES

Ralph S. Zebarth, Bldg. 1, Apt. 2, North Cliff Colony Apartments, Thompton Bridge Road, Gainesville, Ga. 30501

No Drawing. Continuation-in-part of application Ser. No. 2,352, Jan. 12, 1970. This application Nov. 8, 1971, Ser. No. 196,541

Int. Cl. A23b *1/06*

U.S. Cl. 99—194 **12 Claims**

A method of removing excess moisture from cleaned water-bath chilled poultry carcasses, preparatory to cut-up, packaging or freezing thereof, consisting of positioning each carcass with the abdominal evisceration opening lowermost, subjecting the carcass to a quiet atmosphere of sub-freezing air till most of the excess moisture has been expelled from the sub-dermal fascia layers at the exterior surface of the carcass, then subjecting the carcass to a high velocity blast of sub-freezing air, until the total heat content of the carcass, will produce a uniform temperature above the freezing temperature of the flesh, but below the flowing temperature of the body fluids, and until any moisture frozen on the surface of the carcass is vaporized by sublimation and carried away.

3,730,742

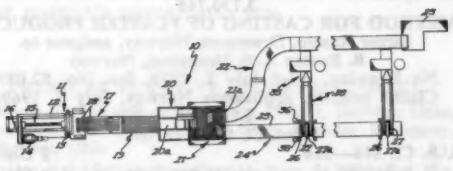
PROCESS AND APPARATUS FOR SLICING AND WEIGHING BACON FOR PACKAGING

Jean A. Burton, T. Stanley White, and Harold M. Myrland, Austin, Minn., assignors to Geo. A. Hormel & Co., Austin, Minn.

Filed May 12, 1971, Ser. No. 142,557

Int. Cl. B26d *4/24*

U.S. Cl. 99—233.11 **6 Claims**



A process and apparatus for slicing and weighing bacon for packaging comprises slicing and placing bacon in

shingle fashion on a sheet of packaging material and conveying these sheets with the bacon slices thereon to a weighing station. Each sheet is weighed to determine if the weight of each sheet is below a predetermined weight, and those sheets that have a weight at least equal to the predetermined weight are directed by a conveyor to a packaging station where these sheets are packaged. Those sheets with bacon slices thereon that have a weight below said predetermined weight are mechanically moved to a reject conveyor which is comprised of a plurality of endless conveyors arranged in end-to-end relation. Transverse conveyors are interposed between the endless conveyor members of the reject conveyor and are normally disposed in a lower inoperative position but are vertically shiftable to an upper operative position to remove weight deficient sheets of bacon from the reject conveyor and direct the same to a weight adjusting station. At the weight adjusting station the weight of each weight deficient sheet is adjusted to equal the predetermined weight, and the sheets thereafter directed by a conveyor to the packaging station.

3,730,743

ZINC DUST COATING COMPOSITION

Gordon Donald McLeod, Adrian, Mich., assignor to Stauffer Chemical Company

No Drawing. Continuation of application Ser. No. 768,208, Oct. 4, 1968, which is a continuation of application Ser. No. 484,768, Sept. 2, 1965. This application Aug. 24, 1970, Ser. No. 66,608

Int. Cl. C09d *5/10*

U.S. Cl. 106—1 **5 Claims**

A coating composition containing particulate zinc and a vehicle consisting of an alkyl polysilicate and an organic solvent.

3,730,744

ALUMINUM PHOSPHATE BONDED REFRACTORY AND METHOD FOR MAKING THE SAME

Paul J. Yavorsky, Wyckoff, N.J., assignor to Basic Ceramics Incorporated, Hawthorne, N.J.

No Drawing. Filed Aug. 31, 1970, Ser. No. 68,547

Int. Cl. C04b *35/48*

U.S. Cl. 106—57 **10 Claims**

A refractory ceramic composition suitable for use in casting refractory shapes and making a ceramic product. The composition comprises a ceramic aggregate which has a particle size distribution suitable for the production of a ceramic article. The aggregate particles are bonded together by an aluminum dihydrogen orthophosphate bonding solution which is cured with a curing agent capable of supplying alkalinizing ions at a controllable rate to the solution to gel the same. The composition is capable of being cast in a mold, and hardens in situ. The cast article has high wet strength and can be stripped from the mold without removal of contained free water. Subsequent relatively intense heating produces the ceramic product.

3,730,745

METHOD FOR CASTING OF PLASTER PRODUCTS

Birger Rustan, Drammen, Norway, assignor to B. Rustan A/S, Drammen, Norway

No Drawing. Filed July 2, 1970, Ser. No. 52,085

Claims priority, application Norway, July 7, 1969, 2,847/69

Int. Cl. C04b *11/00*

U.S. Cl. 106—110 **2 Claims**

It is known to cast plaster products, and it is further known that moulds used for this casting have to be cleaned very frequenly or provided with mould release agents to prevent the plaster from adhering to the mould walls. According to the invention this problem of adhesion to the mould walls is solved by adding hydrogen peroxide to the aqueous plaster composition used for casting.

This invention relates to a method for casting of plaster products.

3,730,746

SILICATE POLYMER VEHICLES FOR USE IN PROTECTIVE COATINGS AND PROCESS OF MAKING

Donald P. Boaz, 3917 Harvest Hill Road, Dallas, Tex. 75234

No Drawing. Continuation-in-part of application Ser. No. 749,587, Aug. 2, 1968. This application Sept. 8, 1970, Ser. No. 70,215

Int. Cl. C09d *5/10;* **C07g** *17/00*

U.S. Cl. 106—287 SE **16 Claims**

Silicate polymer vehicles are obtained by partially hydrolyzing ethyl silicate and reacting the resultant composition with a vinyl, such as vinyl butyraldehyde and one or more additives such as a borate, a silane or a Lewis acid and cellulose to produce a vehicle for use in protective coatings of various kinds and particularly coatings for use on metal.

3,730,747

PIGMENT FORMULATIONS

Horst Belde and Ewald Daubach, Ludwigshafen, Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

No Drawing. Filed Jan. 8, 1971, Ser. No. 105,094

Claims priority, application Germany, Jan. 14, 1970, P 20 01 459.9

Int. Cl. C08h *17/04, 17/14*

U.S. Cl. 106—288 B **6 Claims**

Pigment formulations containing pigments, zinc chloride and water, which are eminently suitable for the mass-dyeing and spin-dyeing of polyacrylonitrile from aqueous concentrated salt solutions.

3,730,748

PRODUCTION OF MIXED OXIDES CONTAINING ALUMINUM OXIDE

Günter Lailach and Gottfried Gerlach, Krefeld, Gerhard Trenczek, Krefeld-Uerdingen, and Karl Brandle, Krefeld, Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 17, 1971, Ser. No. 115,948

Claims priority, application Germany, Mar. 5, 1970, P 20 10 357.5

Int. Cl. C08h *17/04*

U.S. Cl. 106—288 B **10 Claims**

This invention relates to a process for the production of mixed oxides by reacting the tetrachlorides of silicon, titanium, tin or zirconium, or mixtures thereof, and aluminum trichloride in the gas phase with an oxygen containing-gas at temperatures above 900° C., the metal tetrachloride/aluminum trichloride mixture required for the reaction being prepared in such a way that all the heat of reaction liberated during chlorination of the aluminum is utilized, and that, furthermore, any solid secondary products resulting from the chlorination of the aluminum do not need to be removed.

3,730,749

PROCESS FOR PREPARING SILICA PIGMENT

James E. Morgan, Barberton, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

No Drawing. Filed Mar. 10, 1971, Ser. No. 123,073

Int. Cl. C09c *1/28*

U.S. Cl. 106—288 B **8 Claims**

The substantial viscosity increase which occurs during the acidification or neutralization of aqueous alkali metal silicate is substantially minimized by adding a controlled amount of an alkali metal silicate.

3,730,750

ISOLATION OF FINELY DIVIDED DYES FROM LIQUID DISPERSIONS

Wolfgang Fabian, Heidelberg, Germany, assignor to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen am Rhine, Germany

No Drawing. Filed Mar. 15, 1971, Ser. No. 124,482

Claims priority, application Germany, Mar. 23, 1970, P 20 13 818.5

Int. Cl. C08h *17/14*

U.S. Cl. 106—309 10 Claims

Process for the isolation of finely divided dyes, particularly those having valuable tinctorial properties. According to the process a dispersion of a dye in a liquid mixture of organic water-immiscible solvent having a melting point between −20° and +120° C. and water (the mixture may not contain a greater weight of water than of dye) is solidified by crystallization, and the solvent is then removed by sublimation.

3,730,751

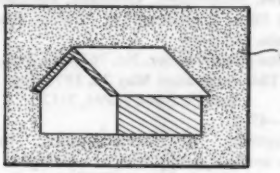
METHOD FOR ERASURE DRAWING

Judah Newberger, 149 S. Broadway, White Plains, N.Y. 10605

Filed June 4, 1971, Ser. No. 149,899

Int. Cl. B44c *1/22;* B44d *1/54*

U.S. Cl. 117—11 4 Claims



A method of drawing an original image by the selective erasing of an erasable coating, such as ink, from a multilayer sheet of drawing material. The coating has a starting shade which contrasts with the shade of the underlying layer, which may be the sheet itself, and is partially erasable to produce intermediate shades of the starting shade. More than one contrasting erasable coating layer may be provided in which instance selective erasing of one or more of the coating layers, either wholly or partially, is utilized to draw the original image.

3,730,752

METHOD OF METAL COATING A FIBROUS SHEET

Alejandro E. Guajardo Garza, Penoles 1515, and Gustavo Guajardo Garza, Colonia del Valle, both of Monterrey, Mexico

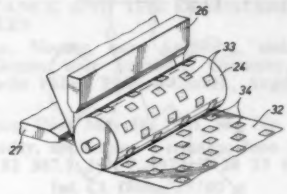
Filed July 26, 1971, Ser. No. 165,942

Claims priority, application Mexico, Sept. 29, 1970, 79,165

Int. Cl. C23c *13/02;* D21h *1/18*

U.S. Cl. 117—11 2 Claims

A rough or porous body, as uncoated paper, paper product, cloth, leather or the like is given an attractive metallized surface, figured or designed or of uniform appearance, by first being given a smooth surface by the application of a film of any of a number of plastic resinous priming materials, then, after solidification of the prime coat, by being given an extremely thin coating of vaporized metal. A design may be inexpensively applied to such a sheet by forming the design in the surface of one or more of the press or thermal rollers used in



shaping and curing the plastic film coating, such design being reproduced in the plastic film during its manufacture and reflected in the finished, metallized surface.

3,730,753

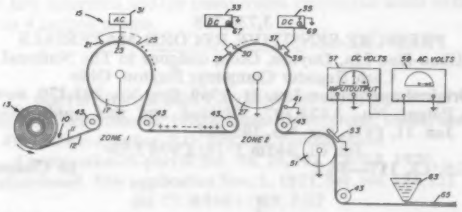
METHOD FOR TREATING A WEB

William C. Kerr, Middlesex, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed July 30, 1971, Ser. No. 167,758

Int. Cl. B44d *1/092*

U.S. Cl. 117—34 19 Claims



An improved method for substantially eliminating charge from a surface of a corona-treated web, particularly for enhancing the surface's coatability. The improved method employs the technique of "flooding" the surface with charge of a first polarity so as to generally uniformly charge the surface and thereafter removing the charge imparted to the surface, so as to leave the surface generally free of charge. To ensure positive control between the amount of charge added to the surface and the amount removed, the invention provides the improvement of monitoring the surface of the web for charge variation and for net charge. The amount of charge added to and/or the amount of charge removed from the surface may be so controlled that the charge variation and the net charge on the surface is lowered to an acceptable level, preferably approximately zero.

3,730,754

PRESSURE SENSITIVE RECORDING SHEET

Sheldon Farber and Arthur John Wright, Dayton, Ohio, assignors to The National Cash Register Company, Dayton, Ohio

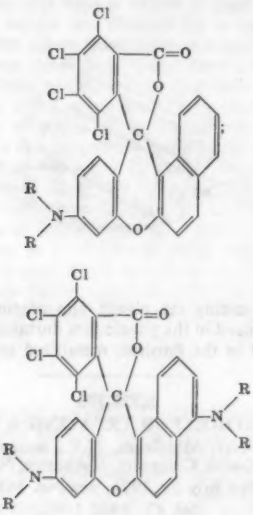
No Drawing. Original application Nov. 3, 1970, Ser. No. 86,644, now Patent No. 3,654,314. Divided and this application Oct. 1, 1971, Ser. No. 185,800

Int. Cl. B41m *5/16*

U.S. Cl. 117—36.2 13 Claims

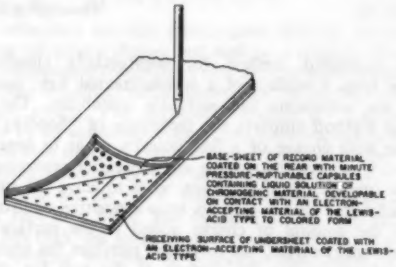
A pressure-sensitive record unit and a mark-forming

unit are disclosed which employ a chromogenic material of normally colorless form having a structural formula:

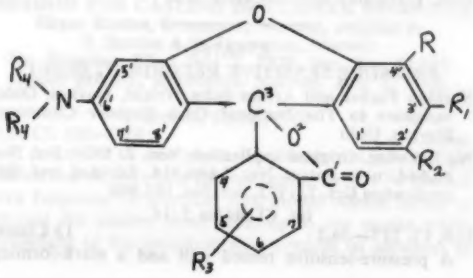


wherein each R is hydrogen or an alkyl radical having 1 to 4 carbon atoms.

3,730,755
PRESSURE-SENSITIVE RECORD MATERIALS
Chao-Han Lin, Dayton, Ohio, assignor to The National Cash Register Company, Dayton, Ohio
Original application Jan. 21, 1969, Ser. No. 792,279, now Patent No. 3,624,107. Divided and this application Jan. 11, 1971, Ser. No. 105,687
Int. Cl. B41m *5/16*; C07d *5/00*
U.S. Cl. 117—36.2 **16 Claims**


BASE-SHEET OF RECORD MATERIAL COATED ON THE REAR WITH MINUTE PRESSURE-RUPTURABLE CAPSULES CONTAINING LIQUID SOLUTION OF CHROMOGENIC MATERIAL DEVELOPABLE ON CONTACT WITH AN ELECTRON-ACCEPTING MATERIAL OF THE LEWIS-ACID TYPE TO COLORED FORM
RECEIVING SURFACE OF UNDERSHEET COATED WITH AN ELECTRON-ACCEPTING MATERIAL OF THE LEWIS-ACID TYPE

A chromogenic material of normally colorless form is disclosed, having the structural formula:



wherein on of R, R_1, R_2, and R_3 represents a nitro- or amino-radical and the remaining other of R, R_1, R_2, and R_3 comprise hydrogen, halogen, phenyl and alkyl radicals and R_4 represents alkyl radicals having less than five carbons; said material assuming a colored form upon reactive contact with a Lewis acid molecule. Examples include 6′-diethylamino - 2′-nitrofluoran; 6′-diethylamino-2′-methyl-4′ - nitrofluoran; 2′ - chloro-6′-diethylamino 3′-methyl-5-nitrofluoran; and 6 - amino-2′-chloro-6′-diethylamino-3′-methylfluoran.

3,730,756
METHOD OF PRODUCING COBALT-COATED COMPOSITE POWDER
Wasyl Kunda and Donald Alan Randell, Fort Saskatchewan, Alberta, Canada, assignors to Sherritt Gordon Mines Limited, Toronto, Ontario, Canada
No Drawing. Filed Apr. 28, 1971, Ser. No. 138,313
Int. Cl. C23c *3/04*
U.S. Cl. 117—47 R **4 Claims**

Finely divided core particles are dispersed in a nickel-containing ammoniacal solution and the solution is subjected to gas reduction to deposit a thin layer of nickel on the particles. The nickel-coated particles are then separated from solution and contacted with a cobalt-containing ammoniacal solution. A layer of cobalt is deposited over the nickel coating by subjecting the solution to gas reduction.

3,730,757
PROCESS FOR ADHESIVE VARNISHING, PRINTING AND GLUING OF PLASTICS
Helmut Knorre, Seligenstadt, Germany, assignor to Deutsche Gold- Und Silber-Scheideanstalt vormals Roessler, Frankfurt am Main, Germany
Continuation-in-part of Ser. No. 762,635, Sept. 25, 1968, abandoned. This application May 25, 1971, Ser. No. 145,975
Int. Cl. B44d *1/094*, *5/12*
U.S. Cl. 117—47 A **9 Claims**

The receptivity of thermoplastics, for example, polyethylene and polypropylene, to coatings is improved by incorporating into the thermoplastic a finely divided, particulate inorganic filler and an organic resin having a softening point lower than the thermoplastic, a softening range of about 30° to 100° C and capable of being degraded by conventional oxidizing pretreatment.

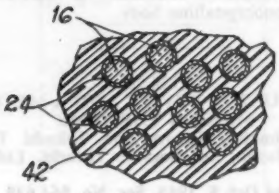
3,730,758
METHOD OF PROTECTING FERROUS STRIP IN HOT-DIP PROCESSES
John N. Laidman, Coopersburg, Pa., assignor to Bethlehem Steel Corporation
Filed Oct. 29, 1970, Ser. No. 85,011
Int. Cl. C23c *1/00*
U.S. Cl. 117—51 **5 Claims**

A method for coating batch annealed ferrous strip with molten metal by a hot-dip process in which fluxing is eliminated. The strip is initially coated with a very thin metallic layer by electroplating or vapor deposition and then, after suitable activation of the surface, passed through a molten metal coating bath.

3,730,759
GLASS FIBER REINFORCED ELASTOMERS
Alfred Marzocchi, Cumberland, R.I., assignor to Owens-Corning Fiberglas Corporation
Filed Dec. 16, 1970, Ser. No. 98,642
Int. Cl. C03c *25/02*
U.S. Cl. 117—72 **26 Claims**

This invention is addressed to the improvement in the bonding relationship between glass fibers and elastomeric materials in the manufacture of glass-fiber-elastomeric products wherein individual glass fibers are coated with a composition containing an anchoring agent in the form

of a titanium orthoester or the reaction product of a titanium orthoester and an amine compound, or bundles of glass fibers are impregnated with a composition con-



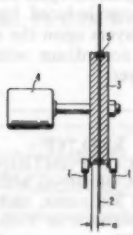
taining an elastomer compatible material and an anchoring agent in the form of the reaction product of a titanium orthoester and an amine compound.

3,730,760

VERTICAL CENTRIFUGAL SPIN COATING METHOD

Alfred A. Machmiller, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 26, 1971, Ser. No. 202,417
Int. Cl. B44d *1/08, 1/06*
U.S. Cl. 117—101 **14 Claims**



A method of spin coating both sides of an object such as a disk substrate by mounting the object in a vertical position, exposing the both sides to be coated, vertically rotating the object about its own axis, and centrifugally coating both sides of the object during rotation of the object. Vertical coating eliminates skittering problems associated with horizontal spin coating and allows accurate thickness control.

3,730,761

COATING OF METALS

Frank Smith, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

No Drawing. Continuation-in-part of application Ser. No. 843,242, July 18, 1969. This application Jan. 7, 1971, Ser. No. 104,733
Claims priority, application Great Britain, Aug. 9, 1968, 38,107/68
Int. Cl. C23c *1/00*
U.S. Cl. 117—131 **4 Claims**

A sheet of titanium, zirconium or tantalum is coated with tinning metal by heating the sheet while the surface to be coated is covered with the tinning metal in the molten state and moving an ultrasonically-excited probe over the surface, with the probe being in contact with the surface and with the molten metal.

3,730,762

PROCESS FOR IMPROVING THE SLIPPING RESISTANCE AND THE DELUSTERING OF TEXTILES

Hans Deiner, Neusas, near Augsburg, and Heinrich Singer, Horgau, near Augsburg, Germany, assignors to Chemische Fabrik Pfersee GmbH., Augsburg, Germany

No Drawing. Filed May 18, 1971, Ser. No. 144,624
Claims priority, application Germany, June 30, 1970, P 20 32 387.9; July 7, 1970, P 20 33 523.3
Int. Cl. D06m *15/00*
U.S. Cl. 117—139.5 CQ **10 Claims**

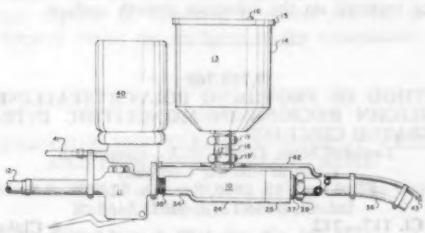
A process for improving the slipping resistance and the delustering of textiles comprises impregnating textiles with organic solutions containing reaction products of alcoholates of zirconium, titanium or aluminum with aliphatic, saturated 1- or 2-valent alcohols with 2 to 6 carbon atoms, or with monoalkyl ethers of these 2-valent alcohols, whereby these monoalkyl ethers have totally 4 to 8 carbon atoms, with paraformaldehyde in a mol ratio of 1:1 to 1:10 and possibly 0.06 to 1 mol metal salts derived from fatty acids with 6 to 18 carbon atoms with 2-valent metals per mol alcoholate as stabilizers. Then the superfluous solution is removed and the textiles are dried. The invention is particularly characterized in that the reaction products are derived from such alcoholates of zirconium, titanium or aluminum wherein 0.5 to 2.5 equivalents of alcohol residues are replaced by residues of low saturated and/or unsaturated carboxylic acids with 2 to 4 carbon atoms.

3,730,763

METHOD FOR DRY PACKING OF SURFACES

Roy Otto Schlottmann, 10810 Estate Drive, Boise, Idaho, and Paul Edward Yadon, P.O. Box 425, Parma, Idaho

Continuation-in-part of Ser. No. 26,992, April 9, 1970, abandoned. This application Nov. 1, 1971, Ser. No. 194,221
Int. Cl. B44d *11/08, 1/02*
U.S. Cl. 117—104 R **3 Claims**



This invention relates to the method for dry packing exposed surfaces, such as holes, cavities, cracks, planar surfaces, and the like, of buildings and structures, and includes the steps of mixing substantially dry granular and binder materials, such as calcined limestone or calcined gypsum material, and wetted sand together; wetting the surface to be finished with commonly known admixtures of adhesives; turbulating and suspending the mixture of materials in a chamber; and blasting the mixture into the wetted surface with sufficient impinging force to cause the mixed materials to pack in the surface. The

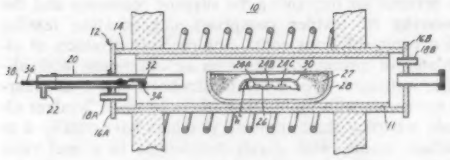
additional steps of applying finely atomized admixture of adhesive to the finished surface and repeating the steps above set out provides a method by which the thickness of the material to be packed may be varied.

3,730,764

PROCESS FOR PRODUCING A PARALLEL OVERGROWTH FOR USE AS AN EPITAXIAL THIN FILM LASER

Gunther H. Dierssen, White Bear Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 23, 1969, Ser. No. 887,650
Int. Cl. H01l *7/32*
U.S. Cl. 117—201 **9 Claims**



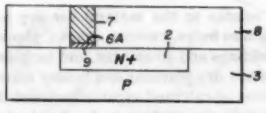
A static atmosphere process for production of laminar laser materials. An epitaxial film or parallel overgrowth of a source material is produced on a single-crystalline substrate. The source material and substrate are each a compound or solid solution of the elements cadmium, sulfur, zinc, selenium and tellurium. The substrate is selected to have an optical band edge at least equal to the source material optical band edge and to have an interatomic spacing within 12% of the interatomic spacing of a crystal of the source material. The substrate is provided with at least one growth surface which is substantially flat and has a crystallographic orientation corresponding to the crystallographic orientation of a naturally occurring major face of a crystal of the source material. The substrate growth surface is positioned proximate a bed of porous source material in a static atmosphere reaction chamber and the source material and substrate material are heated to a uniform predetermined temperature to promote sublimation of the source material to produce a parallel overgrowth of the source material on the substrate growth surface.

3,730,765

METHOD OF PROVIDING POLYCRYSTALLINE SILICON REGIONS IN MONOLITHIC INTEGRATED CIRCUITS

Leonard Stein, Dewitt, N.Y., assignor to General Electric Company

Filed Sept. 15, 1970, Ser. No. 72,402
Int. Cl. B44d *1/18*; M01l *7/16*
U.S. Cl. 117—212 **6 Claims**



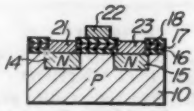
This invention relates to a method of providing selecviding, within a body of monocrystalline silicon semiconductor material, polycrystalline regions at selected locations. Such regions may consist, for example, of columns or walls extending to the exterior surface from selected internal locations, and may be suitably doped to provide isolation or to provide paths of low resistivity forming low resistance connectors to selected locations within the monocrystalline body.

3,730,766

SEMICONDUCTOR DEVICE AND A METHOD OF MAKING THE SAME

Shigeru Nishimatsu, Tokyo, and Takashi Tokuyama, Hoya-shi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 8, 1969, Ser. No. 864,638
Claims priority, application Japan, Oct. 9, 1968, 43/73,133
Int. Cl. B44d *1/18*
U.S. Cl. 117—217 **14 Claims**



A method of stabilizing the surface characteristics of a silicon device wherein a first insulating layer of silicon dioxide is formed upon the silicon substrate, then a second insulating layer of alumina is deposited upon the first insulating layer and thereafter a third insulating layer of silicon dioxide is deposited upon the second insulating layer. The surface charge induced by coating said first and second insulating layers upon the surface of the substrate is controlled in accordance with the thickness of the third insulating layer.

3,730,767

UNDERCOATING COMPOSITION FOR A MAGNETIC RECORDING MEDIUM

Goro Akashi, Masaaki Fujiyama, and Tokuaki Miyake, Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

No Drawing. Continuation-in-part of application Ser. No. 739,172, June 24, 1968. This application Apr. 22, 1971, Ser. No. 136,585
Claims priority, application Japan, June 24, 1967, 42/40,398
Int. Cl. B32b *27/36*; C08g *39/10*; G11b *5/70*
U.S. Cl. 117—239 **8 Claims**

An undercoating composition for bonding a magnetic recording layer, to a support composed of an amorphous polyester and a polycarbonate and a method for forming a magnetic recording device using said undercoating composition and a magnetic recording device resulting from said method are disclosed.

3,730,768

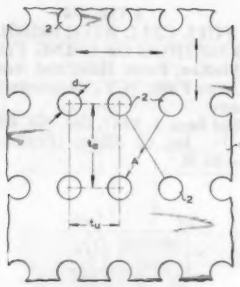
CENTRIFUGE CONSTRUCTION

Kurt Pause, Grevenbroich, Germany, assignor to Maschinenfabrik Buckau R. Wolf Aktiengesellschaft, Grevenbroich, Germany

Filed June 14, 1971, Ser. No. 152,778
Claims priority, application Germany, June 13, 1970, P 20 29 261.9
Int. Cl. C13f *1/10*
U.S. Cl. 127—19 **7 Claims**

A centrifuge has a centrifuge drum provided with a circumferential wall which carries on its interior side a coarse-mesh support screen. A fine-mesh cover screen

overlies the support screen at the interior side thereof and comprises a plurality of apertures which are so distributed



that any four adjacent ones of them are located at the corners of a right-angular pattern.

3,730,769

METHOD AND APPARATUS FOR PROCESSING SOLUBLE CRYSTALS

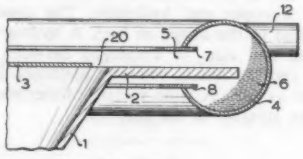
Bernhard Fiedler, Grevenbroich, Germany, assignor to Maschinenfabrik Buckau R. Wolf AG., Munich, Germany

Filed May 26, 1971, Ser. No. 147,128

Claims priority, application Germany, May 27, 1970, P 20 25 828.0

Int. Cl. C13f *1/06*

U.S. Cl. 127—19 16 Claims



Soluble crystals are treated in a centrifuge drum which rotates at a predetermined peripheral speed. The crystals are ejected through an outlet of the drum into a receiver of annular configuration and tubular cross-section, having a circumferential slot through which the crystals are ejected into it. A liquid in which the crystals are soluble is contained in the receiver and rotates at a second peripheral speed which is smaller than the peripheral speed of the centrifuge drum.

3,730,770

SUGAR RECOVERY METHOD

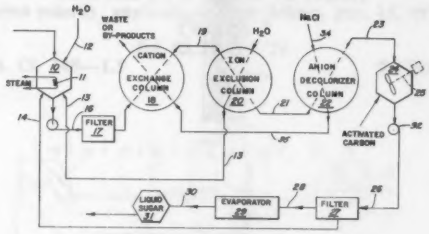
James F. Zievers, La Grange, and Charles J. Novotny, Hickory Hills, Ill., assignors to Industrial Filter & Pump Mfg. Co., Cicero, Ill.

Filed Apr. 7, 1971, Ser. No. 131,912

Int. Cl. C13d *3/12, 3/14*

U.S. Cl. 127—46 B 9 Claims

A sugar recovery process and apparatus utilizes fresh activated carbon particles to treat a sugar solution after it has been deionized and purified in an ion exclusion process and reuses the activated carbon particles to treat



the sugar solution prior to its deionization and ion exclusion treatment.

3,730,771

ELECTRIC ACCUMULATOR

Helmut Tannenberger, Geneva, and Jean-Claude Charbonnier, Chene-Bougeries, Switzerland, assignors to Battelle Memorial Institute, Carouge, Geneva, Switzerland

Filed Oct. 8, 1970, Ser. No. 79,204

Claims priority, application Switzerland, Oct. 9, 1969, 15,148/69

Int. Cl. H01m *35/00*

U.S. Cl. 136—6 20 Claims

An electric accumulator comprises anodic and cathodic compartments which respectively contain an anode made of an alkali or alkaline-earth metal or lanthanum and a cathode made of a sintered solid body including an electronic conductor and an electron acceptor. The two compartments are separated by a fluidtight wall made of a solid substance in which the metal used for the anode can migrate relatively freely at ambient temperature in the form of positive ions. The cathodic compartment contains a solution of a salt of the anode metal in a polar organic solvent capable of dissolving a virtual reaction product formed during the discharge of the accumulator.

3,730,772

SEPARATOR FOR ELECTROCHEMICAL CELLS AND PROCESS OF MAKING SAME

Robert E. Stark, Littleton, Colo., assignor to The Gates Rubber Company, Denver, Colo.

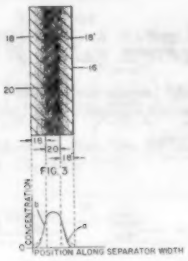
Filed Nov. 3, 1971, Ser. No. 195,385

Int. Cl. H01m *3/04*

U.S. Cl. 136—30 12 Claims

A unitary separator for use in alkaline electrochemical cells is described and includes a bibulous layer impregnated with a gelling agent, the bibulous layer having along its thickness an inner zone containing a relatively high concentration of gelling agent flanked by two outer zones extending to the surface of the bibulous layer and containing a relatively low concentration of gelling agent. A method for producing such a separator is also disclosed and comprises impregnating the bibulous layer with the gelling agent and withdrawing at least a portion

of the gelling agent from the outer surfaces of the bibulous layer to form the desired separator. The separator offers



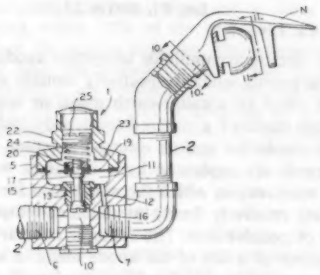
advantages in ease of handling and resistance to dendrite penetrations.

3,730,773

FLOW VOLUME REGULATING VALVE

Carl W. Graber, Lyndhurst, Ohio, assignor to The Royal Brass Manufacturing Company, Cleveland, Ohio

Filed June 11, 1971, Ser. No. 152,228
Int. Cl. F16k *31/145*
U.S. Cl. 138—46 **9 Claims**



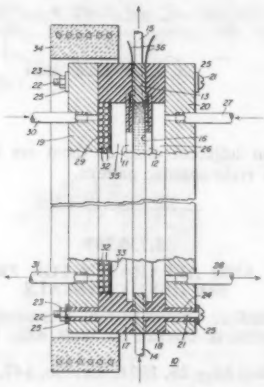
The regulator has a valve body with a lineal passage extending therethrough and having an inlet at one end and an outlet at the other. A valve stem is slidable in the passage, fits therein with limited radial clearance, and has an inlet head and an outlet head seatable in the inlet and outlet, respectively. In cross section, the stem and heads are circular and the passage is polygonal, so that, with the radial clearance, a limited flow passage is provided between the wall of the lineal passage and the walls of the stem and seated one of the heads. The length of the stem between the heads is such than when either head is seated the other is unseated. Each head, when seated, restricts, but does not close, its associate end of the limited flow passage which always is open sufficiently to permit the limited flow. The stem is biased by a spring to hold the outlet head normally in its seated maximum restricting position. A housing having an inlet and outlet encloses the valve body. The housing has a cavity which is connected with the outlet of the lineal passage and is closed at one side by a diaphragm which, in response to a build up of pressure in the cavity, moves the stem in opposition to the spring so as to unseat the outlet head and seat the inlet head. The cavity has a continuously open discharge passage, the flow capacity of which is equal to, or less than, that of the restricted flow passage when the heads are unseated, and is equal to, or greater than that of the restricted flow passage when the inlet head is seated.

3,730,774

AMMONIA FUEL CELL WITH IRIDIUM CATALYST AND METHOD OF USING THE CELL

Douglas W. McKee, Burnt Hills, and Anthony J. Scarpellino, Jr., Glens Falls, N.Y., assignors to General Electric Company

Filed June 1, 1967, Ser. No. 642,947
Int. Cl. H01m *27/30*
U.S. Cl. 136—86 R **3 Claims**



A fuel cell has a catalyst material of iridium or an iridium alloy in the anode chamber and heating means associated with the chamber whereby ammonia vapor, which is fed to the chamber, is dissociated into its constituents, nitrogen and hydrogen. The dissociated gases are supplied to the anode as fuel. A hydrogen permeable membrane can also be employed between the catalyst material and the anode whereby hydrogen is supplied to the anode as fuel. A wide variety of electrodes and electrolyte are suitable in the fuel cell.

3,730,775

TIN HALIDE CATHODE FOR SOLID ELECTROLYTE BATTTERY SYSTEMS

Charles C. Liang, Andover, Mass., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Continuation-in-part of application Ser. No. 81,083, Oct. 15, 1970. This application July 9, 1971, Ser. No. 161,163
Int. Cl. H01m *11/00, 15/06*
U.S. Cl. 136—83 R **4 Claims**

A further improvement in the performance of a solid electrolyte cell containing lithium anode and lithium iodide-lithium hydroxide aluminum oxide electrolyte by the utilization of a cathode material containing a thin halide, such as SnI_2.

3,730,776

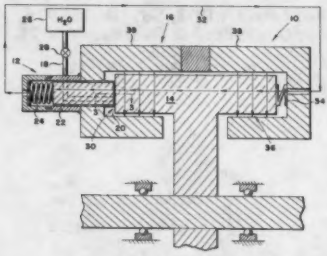
ELECTRIC CURRENT GENERATOR AND METHOD USING CONSUMABLE ALKALI METAL ANODE

Wilson S. Geisler, Jr., Saratoga, Calif., assignor to Lockheed Aircraft Corporation, Burbank, Calif.

Filed Feb. 4, 1970, Ser. No. 8,606
Int. Cl. H01m *17/02, 27/30*
U.S. Cl. 136—100 R **12 Claims**

The effective generation of high electrical currents is provided utilizing materials which are highly electrochemically reactive with one another, such as sodium

and water. The materials are continuously fed together into a very thin, low resistance electrochemical junction between conductive surfaces and moved relative to one another to continuously rapidly remove chemical reaction products from the electrochemical junction. A mechanical energy output may be provided by an integral electrical generator-motor.



3,730,777
SEPARATOR FOR GALVANIC DRY CELLS EMPLOYING AQUEOUS ELECTROLYTE

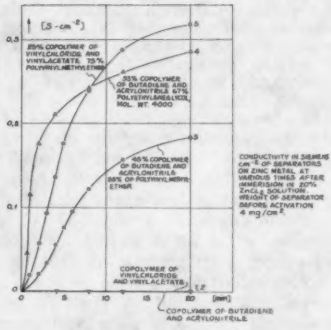
Winfried Krey, Neunheim, Germany, assignor to Varta Gesellschaft mit beschrankter Haftung, Ellwangen (Jagst), Germany

Continuation of abandoned application Ser. No. 806,800, Mar. 13, 1969. This application Apr. 27, 1971, Ser. No. 137,985

Claims priority, application Germany, Mar. 30, 1968, P 17 71 082.6; Mar. 4, 1969, P 19 10 924.1

Int. Cl. H01m *3/02*

U.S. Cl. 136—131 **8 Claims**



Separators for galvanic dry cells which employ an aqueous electrolyte are prepared from mixtures of synthetic resins. At least one of these resins is soluble in water or in the aqueous electrolyte used in the dry cell and at least one resin is insoluble in the cell electrolyte. All the resins employed however must be soluble in the same single or multi-component organic solvent yielding a homogeneous solution. The separator is introduced into the cell by application of the homogeneous solution to one electrode. In contact with the aqueous dry cell electrolyte the separator is rendered permeable to water and dissolved ions. Additional substances such as fillers, swelling agents, ion exchangers, etc., may be incorporated in the separator to improve performance.

3,730,778
METHODS OF MANUFACTURING A SEMICONDUCTOR DEVICE

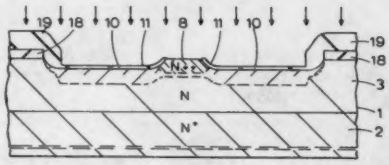
John Martin Shannon, Reigate, and John Anthony Kerr, East Grinstead, England, assignors to U.S. Philips Corporation

Filed Jan. 14, 1971, Ser. No. 106,489

Claims priority, application Great Britain, Jan. 15, 1970, 1,996/70

Int. Cl. H01l *7/54*

U.S. Cl. 148—1.5 **7 Claims**



A method of manufacturing a bipolar transistor in which impurities are introduced into a semiconductor body through a non-planar semiconductor body surface, the nature of the exposed surface being controlled so that the p-n junction formed has a desired contour. An emitter region of the transistor may be formed within a mesa of the semiconductor body surface and the collector junction formed by implantation of base impurity through both the mesa and the adjacent portions of the surface to give a mesa-shaped collector junction and a substantially plane emitter junction. The mesa may be defined by a silica pattern and formed by silicon nitride masking, etching and oxidation.

3,730,779
OXIDATION RESISTANT IRON BASE ALLOY

Elmer J. Caule, 440 Yale Ave., New Haven, Conn. 06515; Philip R. Sperry, 60 Pool Road, North Haven, Conn. 06473; Michael J. Pryor, Maplevale Drive, Woodbridge, Conn. 06515; and James A. Ford, 51 Pool Road, North Haven, Conn. 06473

Original application Aug. 7, 1968, Ser. No. 750,991, now abandoned. Divided and this application Aug. 25, 1970, Ser. No. 66,866

Int. Cl. C23f *7/04*

U.S. Cl. 148—6.35 **2 Claims**

Iron base alloys with alloying additions of Groups III and IV elements and/or beryllium are described which exhibit unique and unexpectedly low weight gains when exposed to oxidizing environments. One of the major advantages of the group of alloys described herein lies in their moderate cost, especially as compared to other oxidation resistant Fe-base alloys such as the various grades of stainless steel. The oxidation resistance is imparted to these alloys through the formation of a tenacious compact oxide film consisting essentially of one or both of the added alloying elements.

3,730,780
METHOD OF TRANSPORTING AND POSITIONING CONTINUOUS CASTING BUTTS

Alfred Pfeuffer, Neu-Isenburg; Gustav Kalkhof, Langen/Hessen; Helmut Weber, Steinbach/Taunus, and Arnold Ludtke, Offenbach, all of Germany, assignors to Messer Griesheim GmbH, Frankfurt Main, Germany

Filed Sept. 14, 1970, Ser. No. 71,825

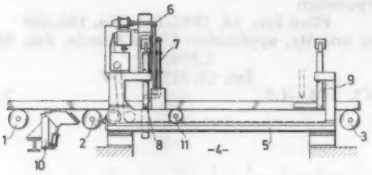
Claims priority, application Germany, Sept. 18, 1969, P 19 47 287.8

Int. Cl. B23k *7/00*

U.S. Cl. 148—9 **3 Claims**

A method of moving and positioning a casting butt produced in a continuous casting plant with the aid of holding

means and a cutting device used as the transport means. The device is secured to the butt, after which they are together moved in one direction into a position that corresponds to a



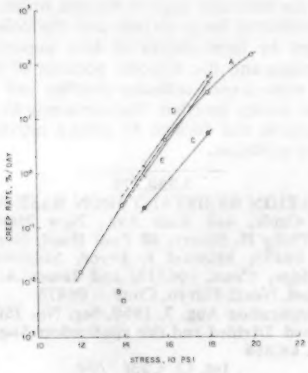
desired cut length, holding means clamp said butt, whereupon the cutting device is released and moved to a starting position operable to cut the held butt.

3,730,781

METHOD OF IMPROVING CREEP-RESISTANCE OF ALLOYS

Leander A. Neumeier and John S. Risbeck, Rolla, Mo., assignors to the United States of America as represented by the Secretary of the Interior

Filed Dec. 8, 1971, Ser. No. 206,079
Int. Cl. C22f *1/16*
U.S. Cl. 148—11.5 R **7 Claims**



Zn-Cu-Ti alloys of improved creep-resistance and low creep anisotropy are prepared by cold-rolling to at least least 67 percent total reduction, followed by annealing preferably at about 300 to 400° F. for a period of about ½ hr. to 8 hrs. Such alloys find utility in a variety of applications such as architectural structures, appliances, automobile parts, etc.

3,730,782

NON-ACTIVATED SOLDERING FLUX

Richard M. Poliak, Johnson City, and Leslie D. Rauch, Binghamton, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

No Drawing. Filed July 27, 1970, Ser. No. 58,644
Int. Cl. C23c *1/12*
U.S. Cl. 148—23 **27 Claims**

A non-activated soldering flux comprising from 20–65% rosin, 0.01–1% of a cationic fluorocarbon surfactant, balance organic solvents. The flux finds particular application in the field of microelectronics.

A process for using the above soldering flux comprises assembling two members to be joined, preferably metallic members, in contiguous relationship, applying the above flux thereto and then soldering the members together.

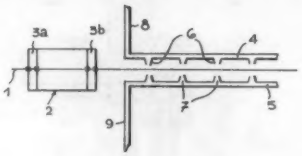
A process for forming a flux as described is also provided.

3,730,783

PROCESS FOR TREATING A COATING OF ALUMINIUM DEPOSITED ON A METAL SUPPORT, MORE PARTICULARLY, SHEET METAL

Dominique Thomas Francois Streel, Ougree, Belgium, assignor to Cockerill-Ougree-Providence et Esperance Longdoz en abrege "Cockerill," Seraing-lez-Liege, Belgium

Filed June 17, 1971, Ser. No. 153,976
Claims priority, application Belgium, June 24, 1970, 752,488
Int. Cl. C23f *7/22*
U.S. Cl. 148—6.3 **4 Claims**



A process for treating an aluminium coating deposited on sheet-metal such as a steel plate, sheet or strip, comprising applying the aluminium coating by evaporation under vacuum, with a thickness less than 20 microns, onto sheet-metal which advances continuously, subjecting systematically the aluminium coating to superficial hot oxidation by passing the coated sheet-metal directly to atmosphere while its temperature is still 100° C. so as to form a film of aluminium oxide, subjecting the thus formed film of aluminium oxide to the action of a hot fluid based on water while the sheet-metal is still advancing continuously in order to transform the aluminium oxide to hydrated aluminium oxide.

3,730,784

METHOD OF MAKING MANGANESE-ALUMINUM-CARBON TERNARY ALLOYS FOR PERMANENT MAGNETS

Hiroshi Yamamoto, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma-shi, Osaka, Japan

Continuation of application Ser. No. 429,260, Feb. 1, 1965. This application July 28, 1969, Ser. No. 850,307
Claims priority, application Japan, Feb. 1, 1964, 39/5,653; Mar. 3, 1964, 39/12,679
Int. Cl. H01f *1/04*
U.S. Cl. 148—101 **10 Claims**

Ternary alloys consisting essentially of, by weight, (a) 67 to 69% Mn, 29 to 32.0% Al, and 0.3 to 3.0% C, and (b) 70.0 to 72.5% Mn, 26.5 to 29.0% Al and 0.5 to 2.5% C, are prepared by heating the selected alloy composition to a temperature of about 1380° C. to form a melt, casting the melt in a mold to form an ingot, quenching the ingot from a temperature of 880° to 1250° C. and then isothermally tempering the quenched ingot at a temperature of 380° to 700° C. The thus heat-treated alloys are suitable for use as permanent magnets with magnetic properties superior to those of binary alloys of similar manganese and aluminum contents.

3,730,785

DUAL STRENGTH BLADE OF 17-4PH STAINLESS STEEL

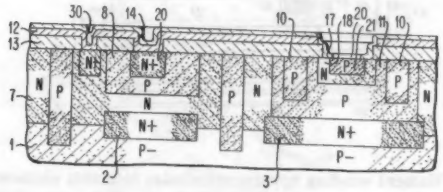
Joseph D. Conrad, Sr., Springfield, and Bruce W. Roberts, Lester, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 14, 1970, Ser. No. 97,555
Int. Cl. C21d *1/80*; F01d *5/14*
U.S. Cl. 148—142 **7 Claims**

A process is described for heat treating a precipitation hardening stainless steel containing, nominally, 17% chromium and 4% nickel for obtaining various mechanical properties. The steps include a solution heat treat-

ment, a conditioning treatment, a first stage aging treatment and a final aging treatment. Various mechanical properties are described including fatigue strength, and damping capacity. Utility is demonstrated in the turbine blade field.

3,730,786
PERFORMANCE MATCHED COMPLEMENTARY PAIR TRANSISTORS
Hitendra N. Ghosh, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Sept. 3, 1970, Ser. No. 69,205
Int. Cl. H01l 7/36, 11/00, 19/00
U.S. Cl. 148—175 **6 Claims**



A method for fabricating a complementary pair of transistors having closely matched characteristics. A high performance npn transistor is matched to a pnp transistor whose performance is upgraded through the use of a doped oxide for simultaneously diffusing the base of the pnp transistor and the emitter of the npn transistor. After the base diffusion is completed, the doped oxide is etched away only from the base region of the pnp transistor and diffusion conditions are reestablished. The base doping of the pnp transistor then redistributes to produce a lower surface concentration and a sharper gradient at the collector base junction while the doped oxide remaining over the npn emitter acts as a continuing source of emitter impurity for enhanced emitter efficiency.

3,730,787
METHOD OF FABRICATING SEMICONDUCTOR INTEGRATED CIRCUITS USING DEPOSITED DOPED OXIDES AS A SOURCE OF DOPANT IMPURITIES
Bernard Thomas Murphy and Peter Theodore Panousis, New Providence, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill and Berkeley Heights, N.J.
Filed Aug. 26, 1970, Ser. No. 67,016
Int. Cl. H01l 7/44, 19/00; C23c 11/06
U.S. Cl. 148—175 **7 Claims**

A method for fabricating semiconductor integrated circuit structures of the type wherein surface zones of a first type semiconductivity extend through an otherwise relatively heavily doped surface layer of the other type semiconductivity. The method employs a doped-oxide mask to provide the layer-forming impurities and also as a mask for enabling selective introduction of zone-forming impurities. An important step in the method employs a silicon nitride cap over the doped oxide during layer-formation to prevent the layer-forming impurities from being introduced into undesired areas under the voids in the mask.

3,730,788
FLUORINE OXIDIZER GAS GENERATOR
Donald S. Jenkins, Tarzana, Calif., assignor to North American Rockwell Corporation
Filed Dec. 4, 1967, Ser. No. 687,896
Int. Cl. C06b 15/00
U.S. Cl. 149—1 **2 Claims**

A gas generator pressurization device using a fluorine oxidizer, a fuel and a fuel-like modifier selected from the group consisting of hexachloroethane (C_2Cl_6), hexabromoethane (C_2Br_6), 1,2,3,4-tetrazole (CHN_4H), 1,2,4,5-tetrazine (N_2CHN_2CH), and cyanuric chloride

($C_3Cl_3N_3$)

The presently preferred fuel-like modifier is cyanuric chloride.

3,730,789
MONOPROPELLANT COMPOSITION INCLUDING HYDROXYLAMINE PERCHLORATE
Kurt F. Mueller and Manfred J. Cziesla, Washington, D.C., assignors to the United States of America as represented by the Secretary of the Navy
No Drawing. Filed July 8, 1969, Ser. No. 843,908
Int. Cl. C06d 5/06
U.S. Cl. 149—22 **15 Claims**

A gelled liquid monopropellant comprising an aqueous solution of a mixture of oxidants such as sodium perchlorate and hydroxylammonium perchlorate, a fuel such as boron, powder and a gelling agent such as silica gel.

3,730,790
EXPLOSIVE COMPOSITION CONTAINING A GLYCOL AND GUAR GUM ETHER
Errol Linton Falconer and Gerhard Franz Otto Karl Finch, Mont Saint-Hilaire, Quebec, Canada, assignors to Canadian Industrial Limited, Montreal, Quebec, Canada
No Drawing. Filed Feb. 29, 1972, Ser. No. 230,520
Int. Cl. C06b 1/04
U.S. Cl. 149—44 **4 Claims**

A gelatinized explosive composition comprising a high energy sensitizer and from about 3% to about 50% by weight of a non-explosive gel comprising at least one lower aliphatic glycol selected from the group consisting of ethylene glycol, diethylene glycol, propylene glycol and dipropylene glycol thickened with a material selected from the group consisting of hydroxyethyl and hydroxypropyl ethers of polysaccharides and mixtures thereof.

3,730,791
EXPLOSIVE COMPOSITION FOR BONDING CONTAINING AN ORGANO METALLIC POLYMER
Robert H. Velten, Boulder, Colo., assignor to E. F. Industries, Inc., Louisville, Colo.
Filed July 16, 1971, Ser. No. 163,156
Int. Cl. C06b 1/04
U.S. Cl. 149—46 **5 Claims**

A highly sensitive explosive having a low detonation velocity formed from a homogenous mixture of a heavy metal oxide such as lead oxide (PbO) and a polyhydroxy compound such as glycerol. The resulting novel explosive is of particular advantage when mixed with commercial explosives and utilized in the high energy bonding of two or more metallic members such as in the formation of honeycomb or other metallic structures.

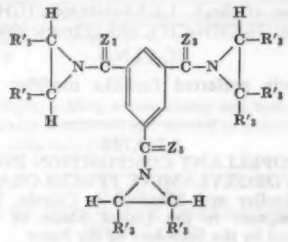
3,730,792
CATALYSIS OF REACTIONS OF AZIRIDINES USED IN PREPARING HIGH ENERGY COMPOSITE PROPELLANTS
Charles B. Frost, Fair Oaks, and Philip S. Gisler, Folsom, Calif., assignors to Aerojet-General Corporation, Azusa, Calif.
No Drawing. Filed Feb. 18, 1964, Ser. No. 346,384
Int. Cl. C06d 5/06; C08c 1/12
U.S. Cl. 149—19 **11 Claims**

11. In the method of preparing a high energy propellant composition which comprises dispersing a solid oxi-

dizer in a binder mixture comprising a terminally reactive polymer having the formula:

$$HOOC—A_2—COOH$$

wherein A_2 comprises a polymer of butadiene, said terminally reactive polymer having a molecular weight of about 6000; and an aziridine compound having the formula:



wherein R'_2 is selected from the group consisting of hydrogen and lower alkyl, and Z_3 is selected from the group consisting of oxygen and sulfur; the improvement which comprises employing zirconium acetylacetonate as the catalyst.

3,730,793
ETHYLDECABORANE OR B_5H_9 WITH MIXED ClF_5 OXIDIZER

Donald Pilipovich, Canoga Park, and John Q. Weber, Topanga, Calif., assignors to North American Aviation, Inc.

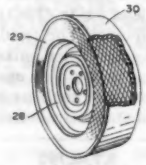
No Drawing. Filed Apr. 5, 1967, Ser. No. 629,865
Int. Cl. C06b *15/00*
U.S. Cl. 149—22 **4 Claims**

Liquid rocket propellant systems comprising a fuel, either ethyldecaborane or pentaborane-9, and an oxidizer of ClF_5 mixed with either an iodine oxyfluoride or an iodine fluoride-tetranitro methane mixture.

3,730,794
METHOD OF PRODUCING A NOVEL COMPRESSIBLE ROLL

William Campbell Ross, Winchester, Mass., assignor to W. R. Grace & Co., Cambridge, Mass.

Continuation-in-part of application Ser. No. 725,577, Apr. 17, 1968, now Patent No. 3,568,286, which is a continuation-in-part of application Ser. No. 588,174, Oct. 20, 1966, now abandoned. This application Sept. 14, 1970, Ser. No. 71,801
Int. Cl. B29h *11/00*
U.S. Cl. 156—112 **19 Claims**

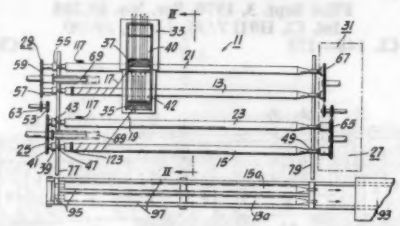


A method of preparing novel products especially suitable as printing rolls is disclosed wherein elastomer-coated filaments (e.g. synthetic rubber coated glass filaments) are wound on a core at an angle to the core and apart from one another and are joined at the cross-over points by the elastomer. The filaments are wound in such a manner that void spaces are defined by the filaments resulting in a porous, compressible structure.

3,730,795
FILAMENT WINDING METHOD

Jonas Medney, Oceanside, and Donald J. Baumgarten, Smithtown, N.Y., assignors to Koppers Company, Inc.

Original application Dec. 18, 1968, Ser. No. 784,812, now Patent No. 3,607,566, dated Sept. 21, 1971. Divided and this application Apr. 14, 1971, Ser. No. 134,087
Int. Cl. B65h *54/00*
U.S. Cl. 156—169 **4 Claims**



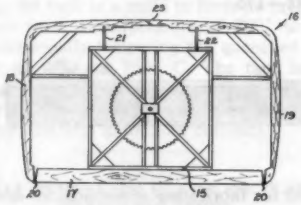
Filament winding apparatus includes rotatable elements mounting supports between which mandrels, on which filament rovings are to be wound, are mounted. A winding head reciprocates along the length of the mandrel located at a winding station. When wound, the elements are rotated to place an unwound mandrel in the winding position. After the filament roving is severed, a wrap-cylinder helps to start to wrap or wind the filament roving on the unwound mandrel, while the wound mandrel is removed, moved into a curing oven, and replaced by an unwound mandrel.

A plurality of supports mounted adjacent a pair of winding heads operated simultaneously make it possible to wind two mandrels simultaneously.

3,730,796
BUILDING CONSTRUCTION AND METHOD OF MANUFACTURE

Reynald B. Richards, 27 Katoomba Road, 5066 Beaumont, South Australia, Australia, and William P. O'Brien, Kingston Park, and Peter Cannon, Glen Osmond, South Australia, Australia; said O'Brien and said Cannon assignors to said Richards

Filed June 4, 1970, Ser. No. 43,399
Int. Cl. B65h *81/08*; E04b *1/32, 1/35*
U.S. Cl. 156—173 **2 Claims**



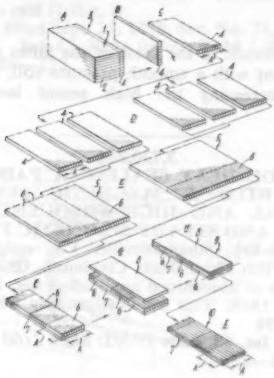
A method of forming portable housing structures in which a substantial rectangular former is produced on a collapsible rotatable mould to provide a shell which forms the floor and roof and walls of the structure in the nature of a tube, the shell comprising inner and outer layers of rigid materials such as fiberglass with an infill material therebetween having thermal insulating properties, and at least partly closing in the ends of the building structure so formed.

3,730,797

METHOD FOR MANUFACTURING BUILDING BOARDS WITH CHEQUER-SQUARE PATTERN

Olav N. Jensen, Kotka, Finland, assignor to O. Y. Gutzeitin Laatikkotehdas-A.B. Gurzeits Ladfabrik, Kotka, Finland

Filed Mar. 11, 1970, Ser. No. 18,626
The portion of the term of the patent subsequent to June 29, 1988, has been disclaimed
Int. Cl. B32b *31/00*
U.S. Cl. 156—182 5 Claims



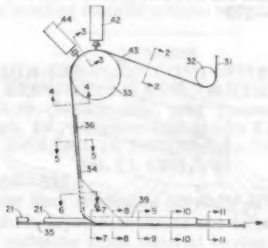
A method of manufacturing chequer-square parquet building boards of unrestricted length. The veneer strips constituting the exposed outer face of a finished parquet board all stand on their narrow faces. The narrow faces are secured to a flat base and the grain in every veneer strip runs parallel to the plane of the base to which the strips are secured. Starting with a stack of veneer sheets having identical grain direction and glued together to form a multilayered board, sticks are cut from the multilayered board and the strips are rotated to form a core board. The core board is cut up into core slabs. The core slabs are glued between flat base plates to form a sandwich and the sandwich is split by a cut through its core into two boards, each of which has a surface of veneer strips standing on their narrow faces.

3,730,798

METHOD OF FORMING AND ADHERING A WEB OF MATERIAL TO THE LOWER SURFACE OF A PAD OR THE LIKE

Norman J. Franz, Colerain Township, Hamilton County, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Aug. 26, 1970, Ser. No. 66,932
Int. Cl. B32b *3/04, 7/14, 31/04*
U.S. Cl. 156—201 8 Claims



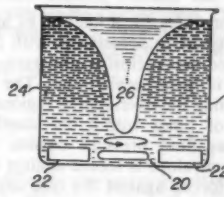
A continuous web of material, e.g. polyethylene or the like, is moved in a substantially horizontal path for at least a portion of its total path of travel such that its ultimate lower surface faces upwardly. In this portion of its travel path, one or more adhesive beads may be intermittently or continuously deposited at or near the web edges whereupon the web is passed over a suitably configured folding board. As the web passes over the folding board, its ultimate lower surface is folded down and around a pad or the like element, e.g. an absorbent diaper pad, such that the edge extremities of the web containing the adhesive beads are folded around and adhered to the lower surface of the pad. The method permits deposition of the adhesive bead on the ultimate lower surface of the web when it faces upwardly thus making the application of adhesive more positive and reducing substantially the possibility of adhesive fouling on the various elements used to carry out the method.

3,730,799

METHOD FOR METALLIC PATTERN DEFINITION

Jack W. Scannell, Richardson, Tex., assignor to Collins Radio Company, Dallas, Tex.

Filed July 7, 1971, Ser. No. 160,386
Int. Cl. C23f *1/02*; H05k *3/06*
U.S. Cl. 156—5 1 Claim



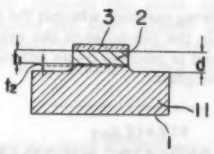
A metallic pattern definition system with improved tolerances wherein a plated substrate is emersed in an etchant solution and a vortex is established in said solution centered generally over said substrate. A rotatable substrate holder with magnetic induction means may be employed in establishing said vortex.

3,730,800

METHOD OF MAKING GERMANIUM SEMICONDUCTOR DEVICE

Shinichi Nakashima, Suita, and Morio Inoue and Hitoo Iwasa, Takatsuki, Japan, assignors to Matsushita Electronics Corporation, Kadoma, Osaka Prefecture, Japan

Filed Dec. 24, 1969, Ser. No. 887,935
Claims priority, application Japan, Dec. 27, 1968, 44/433; Dec. 30, 1968, 44/346
Int. Cl. H01l *7/50*
U.S. Cl. 156—8 2 Claims



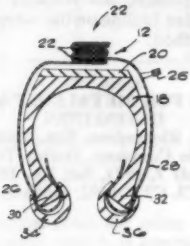
A method of making a germanium mesa-type semiconductor device by mesa-etching employing as an etching mask, a film of SiO_2 applied onto the surface of a germanium substrate. The SiO_2 film can be formed by thermal decomposition of organo-oxy-silane so as to have a thickness of about 1000 to about 7000 A. The mesa-etching can be made either by electrolytic etching or by chemical etching.

3,730,801

RETREATING OF TYRES

Aubrey Wilfred Martin, Heilbron, Orange Free State, Republic of South Africa, assignor to Republic Rubber Industries Limited, Heilbron, Orange Free State, Republic of South Africa

Filed Apr. 26, 1971, Ser. No. 137,195
Claims priority, application Republic of South Africa, Nov. 6, 1970, 70/7,541
Int. Cl. B29h *5/04, 17/36*
U.S. Cl. 156—96 2 Claims



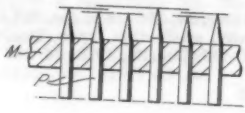
The invention provides for a method of and means for the retreading of tyres. In accordance with the invention, a tyre is retreaded by enclosing the tyre in a flexible envelope which is peripherally slit. The en velope is sealed by interfolding the overlapping regions of the envelope a plurality of times within one another. By then providing a higher fluid pressure outside the envelope than inside it, the envelope is forced against the new tread which is thereby forced against the tyre casing.

3,730,802

METHOD OF FIXING PINS IN A MATRIX

David Bruce Stewart, Newtyle, Angus; John Main, Kettins, Angus, and Maurice Duncan, Carnoustie, all of Scotland, assignors to Wm. R. Stewart & Sons (Hacklemakers) Limited, Dundee, Scotland

Filed March 10, 1970, Ser. No. 18,095
Claims priority, application Great Britain, March 10, 1969, 12,478/69
Int. Cl. B32b *35/00*
U.S. Cl. 156—98 6 Claims



A carding or a drawing machine wherein the pins are a non-interference fit within the pin holes in the cylinder or other matrix and are secured in position by an adhesive which may or may not be a thermoplastic.

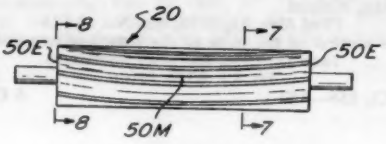
3,730,803

METHOD OF REDUCING SOUND LEVEL OF SINGLE FACER MACHINE

Walter C. Morrison, Marlton, N.J., assignor to Harris-Intertype Corporation, Cleveland, Ohio

Original application Nov. 9, 1970, Ser. No. 88,043, now Patent No. 3,671,361. Divided and this application Dec. 1, 1971, Ser. No. 203,668
Int. Cl. B31f *1/22*
U.S. Cl. 156—205 3 Claims

A single facer machine is disclosed having bowed flutes on the corrugating rollers. The curvature of the bow of the flutes is chosen so that the middle portion of the flutes is disposed from a line interconnecting the ends of a flute by a distance corresponding to one pitch of the



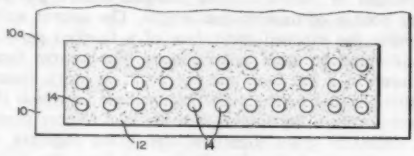
flutes. This results in the crest of the flutes always being in engagement with a smooth pressure roll, thereby substantially decreasing the high sound level of such machines.

3,730,804

METHOD OF HEAT SEALING A PAIR OF CLOSURES WITH A MAGNETIC SUSCEPTIBLE MATERIAL AND HIGH FREQUENCY ALTERNATING AND STEADY MAGNETIC FIELDS

John W. Dickey, Standardsville, Va., assignor to The Fifth Third Bank, Cincinnati, Ohio

Continuation of abandoned application Ser. No. 754,029, Aug. 20, 1968. This application July 20, 1971, Ser. No. 164,496
Int. Cl. B29c *19/02;* B65b *7/00*
U.S. Cl. 156—272 5 Claims



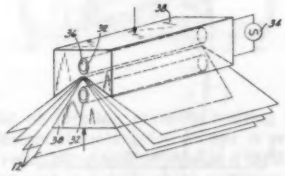
A method of heat-sealing packages is provided wherein elements thereof to be sealed are heated and held by the combined heating and holding action of magnetic susceptible particles subjected to high frequency alternating and steady magnetic fields and to such a method wherein a heat softenable sealing material comprises a thermoplastic adhesive added to the elements of the package to be sealed, or the softenable material may comprise the packaging per se.

3,730,805

METHOD OF JOINING BOOK LEAVES

William C. Heller, Jr., Milwaukee, Wis., and Leonard Shatzkin, Croton-on-Hudson, N.Y.; said Shatzkin assignor to said Heller, Jr.

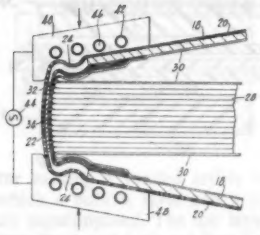
Filed Sept. 22, 1970, Ser. No. 74,270
Int. Cl. B29c *19/02;* B42d *1/00*
U.S. Cl. 156—272 26 Claims



An improved method of joining a plurality of leaves into a book section through the use of an adhesive thread. The thread is typically coated with an adhesive bonding

agent and is heatable by indirectly applied energy. The leaves are stitched together with the thread after which the thread is exposed to the indirectly applied energy to heat the thread and induce a period of adhesiveness in the bonding agent to fuse the strands of thread together and to the leaves. A book section having an improved sewn seam or joint is thus provided.

3,730,806
BOOK BINDING PROCESS
William C. Heller, Jr., Milwaukee, Wis., and Leonard Shatzkin, Croton-on-Hudson, N.Y.; said Shatzkin assignor to said Heller, Jr.
Filed Sept. 22, 1970, Ser. No. 74,271
Int. Cl. B29c *19/02;* **B42d** *1/00*
U.S. Cl. 156—272 **24 Claims**



An improved process of attaching a book body to a case at the hinge to form a hard bound book. A bonding agent having a short period of adhesiveness following exposure to indirectly applied energy is applied to the body or case adjacent the hinge area and the body is inserted into the case so that the portion to which the agent has been applied is located at the hinge of the completed book. The treated portion is then exposed to a selected form of indirectly applied energy to cement the body to the case at the hinge while pressure is applied to the hinge area. An improved hinge joint is thus formed.

3,730,807
AZIRIDINE-β-PROPIOLACTONE ADHESIVES
Harry A. Smith, Midland, and Bobbie E. Rooker, Hope, Mich., assignors to The Dow Chemical Company, Midland, Mich.
No Drawing. Filed Nov. 23, 1970, Ser. No. 92,181
Int. Cl. B32b *15/08;* **C08g** *33/08*
U.S. Cl. 156—331 **9 Claims**

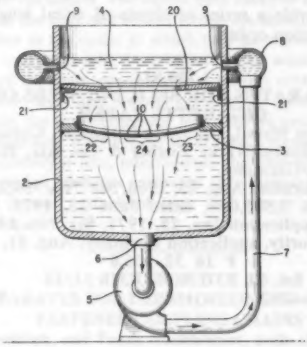
The reaction products of (a) β-propiolactone and (b) N-substituted aziridines which bear one or more polar groups on the N-substituent are novel adhesives. E.g., the reaction product of (a) β-propiolactone and (b) N-(2-aminoethyl)aziridine is an excellent adhesive for bonding aluminum substrates. The adhesives are particularly effective in bonding metallic articles together.

3,730,808
PRODUCTION OF COMPOSITE FIBER REINFORCED RESIN ARTICLES
Frank Fekete, Monroeville, and Leonard J. Pulman, Pittsburgh, Pa., assignors to Koppers Company, Inc.
Filed Sept. 24, 1970, Ser. No. 74,972
Int. Cl. C09j *5/02*
U.S. Cl. 156—332 **3 Claims**

Composite fiber reinforced polyester resin articles comprising a multi-layered structure the interior of which is formed of polyester resin material having fiber reinforcement incorporating relatively coarse or heavy fibers in a relatively thick and/or dense fiber reinforcement mat, and a surface layer which is formed of polyester resin material which may also have a fiber reinforcement but formed of relatively fine or light fibers in a relatively thin and/or sparse fiber reinforcement mat. The formation of the composite structure contemplates the use of prethickened uncured polyester resin material for both the interior portions or layers of the article and also for

the surface layer, and polyester resin formulations having different characteristics are contemplated for use in the interior and surface layers, respectively, the several layers being preassembled and then consolidated and cured under heat and pressure.

3,730,809
RE-ETCH PROCESS FOR COLOR CATHODE-RAY TUBE
Leonard Dietch, Skokie, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.
Filed May 3, 1971, Ser. No. 139,482
Int. Cl. C03c *15/00*
U.S. Cl. 156—345 **1 Claim**

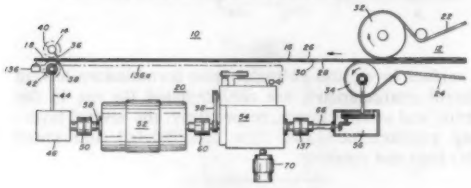


An apparatus for re-etching the apertures of a color cathode-ray tube shadow mask to increase the diameter of each aperture by an amount dependent upon its spacing from the center of the mask. The apparatus comprises a tank adapted to contain a fluid etchant suitable for attaching the mask material, with circulating means to flow the fluid etchant through the mask apertures and baffling means to direct the fluid etchant through the apertures at velocities which differ from aperture to aperture as a function of the aperture spacing from the center of the mask.

3,730,810
CORRUGATED PAPERBOARD CUTTING APPARATUS
Hugo Klein, Jesingen, Teck, Germany, assignor to Gebr. Eickhoff, Maschinenfabrik und Eisengiesserei m.b.H., Bochum, Germany
Filed June 15, 1971, Ser. No. 153,213
Int. Cl. B26d *5/20*
U.S. Cl. 156—353 **11 Claims**

After corrugated paperboard is completely prepared by pasting paper facing sheets to opposite sides of an intermediate corrugated sheet, the resulting elongated strip of

corrugated paperboard moves out of the pasting machine to cutters where the strip is cut into separate sheets of a length in accordance with the specification of a current production order before the sheets move along a conveyor line to a subsequent work station. Common drive means for the cutters and pasting machine include a planetary gear having a speed adjusting gear for reducing the speed of delivery of paperboard from the pasting machine when necessary such as when a subsequent production



order requires different length specifications. Moreover, additional gear means together with a photoelectric cell are provided for sensing suitable marks or optical indicia as printed on one side of the paperboard strip at regular intervals to cooperate with other sensor means such as another photoelectric cell associated with the cutters for sending separate electrical impulses to a servomotor in order to provide a series of sheets of equal length for a given production order.

3,730,811

APPARATUS FOR SPLICING WEBS OF CIGARETTE PAPER

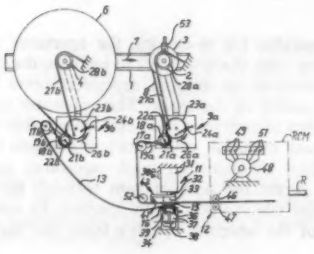
Gerd-Joachim Wendt, Hamburg-Bergedorf, Germany, assignor to Hauni-Werke Korber & Co. KG, Hamburg-Bergedorf, Germany

Original application Aug. 25, 1968, Ser. No. 755,255, now Patent No. 3,586,006, dated June 22, 1971. Divided and this application Jan. 28, 1971, Ser. No. 110,415

Claims priority, application Germany, Aug. 31, 1967, P 16 32 206.8

Int. Cl. B31f *5/06*; B32b *31/18*

U.S. Cl. 156—367 **9 Claims**



The leading end of a fresh web which is stored on a reel is automatically spliced to an expiring web when the machine which consumes the expiring web and draws such expiring web from a source of supply is arrested in response to a signal from a detector which scans the supply of expiring web and produces the signal when the supply of expiring web is depleted to a predetermined minimum value. The consuming machine is started with a predetermined delay following completion of the splicing operation and is accelerated to normal operating speed in several stages at such a rate that the united webs which are accelerated in response to acceleration of the consuming machine are not subjected to excessive tensile stresses.

3,730,812

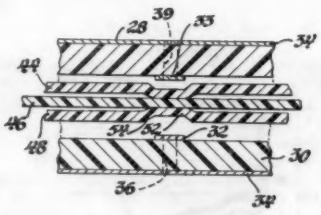
HEAT SEALING DIE

Bert C. Prisk, Grosse Pointe Woods; Raymond Kenneth Erickson, Warren, and Marion E. Wheatley, Sterling Heights, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 14, 1970, Ser. No. 97,522

Int. Cl. B30b *15/02*, *15/34*

U.S. Cl. 156—380 **3 Claims**



A dielectric die for use in heat sealing thermoplastic sheets comprising a laminate consisting of a rigid thermoset resin sheet having thin metal layers bonded to each side thereof with the metal layers being electrically connected through the thermoset resin layer at a plurality of locations. One of the copper layers has portions etched away to form an electrode of a desired configuration. The other metal layer is adapted for electrical connection to a source of electrostatic microwave energy. The invention includes a method for making the die which includes the steps of electrically connecting the metal sheets by drilling holes through the laminate and electroplating an electrical conducting metal in the holes, and etching away portions of one of the metal sheets to form an electrode of the desired configuration.

3,730,813

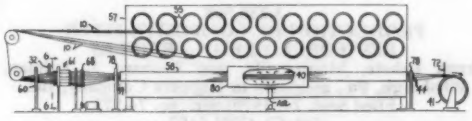
APPARATUS FOR COMBINING TEXTILE STRANDS

Warren W. Drummond, Allison Park, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Application Oct. 29, 1970, Ser. No. 85,253, now Patent No. 3,686,772, which is a division of application Ser. No. 829,521, June 2, 1969, now Patent No. 3,577,872. Divided and this application Mar. 31, 1972, Ser. No. 239,992

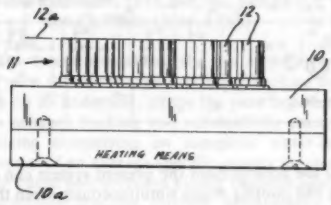
Int. Cl. D04h *3/12*

U.S. Cl. 156—441 **1 Claim**



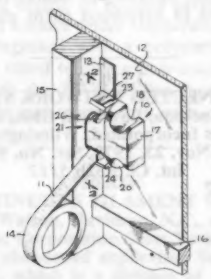
Means to coat individual strands. Oven means including a plurality of tubular driers, arranged in parallel and having drying gas flowing counter current to the direction of strand travel, receive each an individual coated strand. Means provide lateral motion to each strand while in the drier and means combine and collects the combined strand.

3,730,814
DIE FOR MAKING BEADED ARTICLE
Minoru Kuroda, Amagasaki-shi, Hyogo, Japan, assignor to Nishizawa Shoji Co., Ltd., Osaka, Japan, and The Dimension Weld International Corporation, New York, N.Y., a fractional part interest to each
Application Mar. 18, 1969, Ser. No. 808,128, which is a continuation-in-part of application Ser. No. 662,962, Aug. 24, 1967, both abandoned. Divided and this application Oct. 13, 1970, Ser. No. 80,384
Claims priority, application Japan, Dec. 19, 1966, 41/115,532, 41/115,533, 41/115,535, 41/83,085
Int. Cl. B32b *31/00;* **B30b** *15/34*
U.S. Cl. 156—515 **4 Claims**



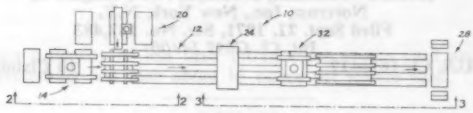
A die for making a beaded article having a support layer on which a bottom layer and a top layer of sheet material are superimposed. The top layer is heat bonded to the bottom layer and both are heat bonded to the support layer along a circumferentially complete narrow annular zone. In the area circumscribed by the annular zone the top layer is provided with a raised self-supporting bead-like prominence which contains ornamental particles visible to a viewer because the top layer is of transparent material. The die has a bas portion from which extend projections whose free end faces are formed with recesses which are bounded by annular cutting edges located in the plane of the respective endface, and by a bevelled shoulder which is inwardly inclined away from the associated cutting edge.

3,730,815
TAPE APPLICATOR
Leon Terzian, 8448 Samra Drive, Canoga Park, Calif. 91304
Filed Aug. 10, 1970, Ser. No. 62,303
Int. Cl. B32b *31/18; 31/20*
U.S. Cl. 156—527 **10 Claims**



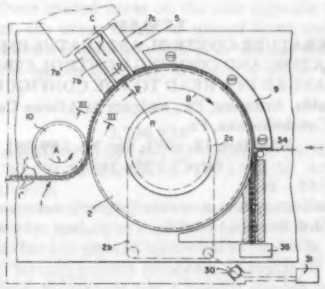
An applicator for installing a pressure sensitive tape onto a work surface is disclosed herein having a body which includes a finger holding portion and a tape tensioning and applying portion that is laterally carried on the finger holding portion. The applying portion includes an oval, in cross-section, member which is disposed in fixed spaced relationship between a pair of retainers laterally carried on the ends of the finger holding portion so as to define a pair of side opening slots for conducting a portion of tape therethrough. Resiliently biased pressure means are carried by the retainer and serve to press against the tape as the applicator is moved along the work surface. Means are provided accommodating a variety of tape widths as well as for severing applied tape from its storage roll.

3,730,816
APPARATUS FOR LAYING UP MULTIPLE-PLY CROSS-BONDED PLYWOOD PANELS
John H. Crawford, Corvallis, Oreg., assignor to Leading Plywood Corp., Corvallis, Oreg.
Filed Nov. 16, 1970, Ser. No. 89,746
Int. Cl. B32b *31/04*
U.S. Cl. 156—559 **11 Claims**



Apparatus for laying up cross-bonded multiple-ply plywood panels comprising a main conveyor line for moving veneer sheets and core sheets, one after the other, through a glue applicator. The applicator applies a glue coating to the upper surfaces of the sheets. The sheets then move to a stacking region where the core and veneer sheets are stacked one on top of the other in the order in which they have been carried on the main conveyor line. Core sheet supply means positioned laterally of the main conveyor line delivers core sheets onto the main conveyor line. Veneer sheet supply means positioned in line with the main conveyor line delivers veneer sheets to the conveyor line. Face veneer sheet supply means superposed over the conveyor line, intermediate the glue applicator and stacking region, delivers uncoated face veneer sheets to be layed on top of a stack of core and veneer sheets in the stacking region.

3,730,817
APPARATUS FOR THERMOFIXING OF SLIDE-FASTENER COUPLING CHAINS
Alfons Frohlich, and Franz Hochlehnert, both of Essen, Germany, assignors to Opti-Holding AG., Glarus, Switzerland
Division of Ser. No. 4,870, Jan. 22, 1970. This application March 24, 1971, Ser. No. 127,816
Claims priority, application Germany, Aug. 23, 1969, P 19 42 935.7; Oct. 9, 1969, P 19 50 810.2
Int. Cl. B32b *31/00;* **B23k** *1/06*
U.S. Cl. 156—580 **10 Claims**



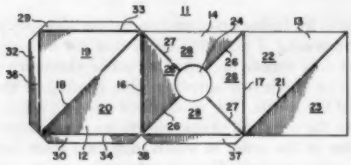
A method of and an apparatus for the fixing or setting of continuous coupling elements of chains, preferably in the form of meandering or coiled monofilament, wherein the

coupling element is passed about a drum with predetermined coupling-head spacing through a station at which an ultrasonic transducer thermally sets the coupling element. Juxtaposed with the periphery of the transport wheel, which maintains the spacing of the turns or undulations of the coil or the meander, is a radially reciprocable member constituting the vibration source or the anvil against which the vibrator operates.

ERRATUM

For Class 156—14 see:
Patent No. 3,730,899

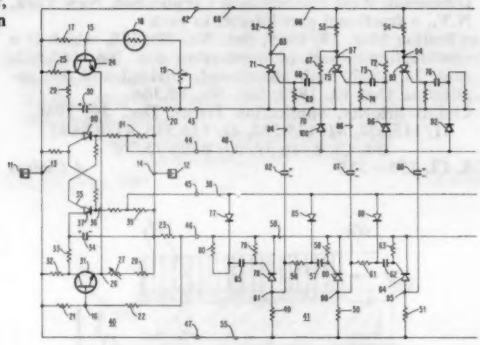
3,730,818
EXPANDABLE NOVELTY DEVICE
Richard V. Salinari, Brooklyn, N.Y., assignor to Norcross, Inc., New York, N.Y.
Filed Sept. 21, 1971, Ser. No. 182,483
Int. Cl. G09f *14/00*
U.S. Cl. 161—17 **10 Claims**



A pop-up device collapsible to a flat state and expandable to a pyramidal shape is formed of a unitary blank and includes three square panels, each of the first and second panels having a diagonal fold line extending from the device apex and the third panel having fold lines extending between opposite corners. The edges of the first and second panels extending from the apex are defined by fold lines and the other edges of the first and second panels are joined to respective edges of the third panel along corresponding edges to define fold lines. In the device collapsed condition, the third panel is folded flat along a diagonal and is sandwiched between the flattened superimposed first and second panels. By applying pressure to the opposite corners of the folded third panel, the device is expanded by unfolding the third panel to a base member and the first and second panels to pyramidal walls.

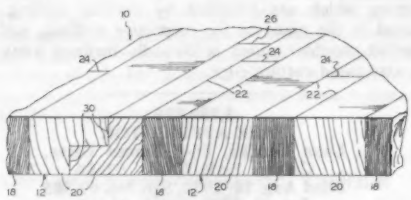
3,730,819
TEMPERATURE CONTROL APPARATUS EMPLOYING HEATING AND COOLING CONTROL CIRCUITS ARRANGED IN A HEAD TO TOE CONFIGURATION
Egils Evalds, Ardmore, Pa., assignor to Athena Controls, Inc., West Conshohocken, Pa.
Filed Oct. 18, 1971, Ser. No. 189,881
Int. Cl. F25b *29/00*
U.S. Cl. 165—26 **8 Claims**

The present system is a time proportional system for controlling both heat and cooling. The present system provides a plurality of stages of individual heating control circuits and a plurality of stages of individual cooling control circuits. The system in general follows a last on-first off procedure. The ascending stages of the heating series are respectively circuitry connected to the descending stages of the cooling series, i.e., the first stage of the heating series is connected to the last stage of the cooling series and vice versa so that when a heating stage is turned on it will cause the cooling stage to which it is connected to be turned off and vice versa. Because of the



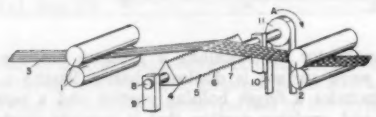
head to toe arrangement the present system can employ both heating and cooling stages simultaneously when the conditions warrant such an arrangement.

3,730,820
SOFTWOOD-HARDWOOD LAMINATED PANEL
Walter M. Fields, 13975 SW. 20th, Beaverton, Oreg. 90075; and Richard W. Mayer, 5660 SW. Wilbard, Portland, Oreg. 97219
Filed July 19, 1971, Ser. No. 163,962
Int. Cl. B32b *3/10;* **E04c** *2/00*
U.S. Cl. 161—38 **11 Claims**



A high strength, lightweight, laminated panel includes boards composed of hardwood strips glued to softwood strips.

3,730,821
INTERCONNECTED NETWORK STRUCTURE
David B. Jackson, Loveland, Ohio, assignor to Hercules Incorporated, Wilmington, Del.
Filed Nov. 23, 1970, Ser. No. 92,099
Int. Cl. B32b *5/12*
U.S. Cl. 161—57 **3 Claims**



A longitudinally striated film is contacted with a rotatable precision fibrillation apparatus controlled to con-

tact the film between about 0.5 to 2 impacts per linear inch between each pair of adjacent striations. The result is a plurality of continuous backbone filaments interconnected by substantial lengths of unsplit web sections. This interconnected web can be opened to form a unique network structure useful in a variety of laminar, non-woven fabric applications and as a reinforcing web in paper or plastic films.

3,730,822

COMPOSITE OF FABRIC WITH FLEXIBLE BACKING

John A. Lovell, Monroe Falls, and Philip G. Harris, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed March 29, 1971, Ser. No. 129,187

Int. Cl. D05c *15/04, 17/00*

U.S. Cl. 161—66 **8 Claims**

A composite structure suitable for use as a carpet which comprises a yarn tufted through a primary backing to create yarn bundles on its underside, where the yarn bundles are adhered to the primary backing and substantially encapsulated by a backsizing comprising an inorganic water-insoluble granular material of an average specific gravity greater than 1 and a flexible cured polyurethane binder therefor applied as a liquid polyurethane reaction mixture substantially free of volatile solvent. The invention has particular utility in creating carpet with a flexible backsizing where the backsizing is applied as a granular material with a liquid reaction mixture without striking through to the face of the carpet.

3,730,823

EDGING MATERIAL FOR APPLICATION TO THE EDGES OF SUBSTRATES

Lee E. Veneziale, Jr., Tyrone, Pa., assignor to Westvaco Corporation, New York, N.Y.

No Drawing. Continuation-in-part of application Ser. No. 113,455, Feb. 8, 1971. This application Aug. 30, 1971, Ser. No. 176,233

Int. Cl. C09j *7/04*

U.S. Cl. 161—82 **5 Claims**

A decorative, functional edging material for application to the edges of panels or substrates. The edging material is a polyester resin impregnated paper sheet coated on the back side with a high viscosity thermosetting hot-melt glue. The base of the edging material is a single sheet of paper, preferably an alpha cellulose or kraft saturating paper having a basis weight of at least 65 pounds, impregnated with a polymerizable unsaturated polyester resin. The hot-melt glue is an ethylene-vinyl acetate copolymer, having certain definite characteristics which enable the edging to become permanently bonded to the edge panel surface under temperature and pressure. The sheet, impregnated with a polymerizable polyester resin, is suitably cured to give a non-cracking edging material, coated with the hot-melt glue, and cut into strips of suitable widths and wound into rolls.

3,730,824

CONTINUOUS FILAMENT WEBS

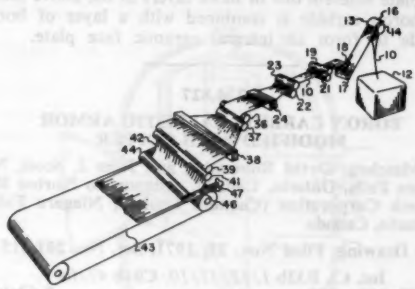
George A. Watson, Davidson, N.C., assignor to Celanese Corporation, New York, N.Y.

Continuation of abandoned application Ser. No. 871,366, Oct. 20, 1969, which is a division of application Ser. No. 650,796, July 3, 1967, now Patent No. 3,501,811, which in turn is a continuation-in-part of abandoned application Ser. No. 382,263, July 13, 1964. This application Oct. 18, 1971, Ser. No. 189,995

Int. Cl. B32b *5/02*

U.S. Cl. 161—142 **3 Claims**

A method for producing a lightweight web of continuous filaments and the product produced thereby comprising deregistering a tow of continuous crimped filaments and subsequently subjecting the deregistered tow to a plurality of spreading stages to produce a web having a density of less than 1 ounce per square yard and preferably less than about ½ ounce per square yard.



3,730,825

DECORATIVE SHEET MATERIAL HAVING PLURAL ADHESIVE LAYERS

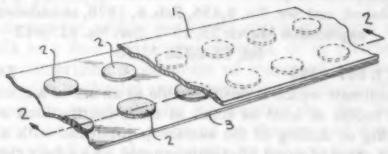
Buhei Nakane, 1–92 Kitashirakawa Maruyama-cho, Sakyo-ku, Kyoto, Japan

Continuation-in-part of abandoned application Ser. No. 288,513, June 17, 1963. This application Apr. 7, 1970, Ser. No. 24,420

Claims priority, application Japan, June 21, 1962, 37/26,021

Int. Cl. B32b *3/10*

U.S. Cl. 161—148 **4 Claims**



A decorative material for adhesive attachment to a solid surface by wetting one surface of the decorative material consisting essentially of a decorative sheet material selected from paper and textile fabrics, a pressure- and thermosensitive adhesive agent coated on one surface of this decorative sheet in a series of spaced areas in a repeating pattern of a selected design and a self-supporting film of a water- and thermosensitive adhesive agent bonded to these spaced areas on the side opposite the decorative sheet, the areas being so spaced from each other that when the self-supporting film is in contact with water both adhesive agents comingle to form a single adhesive layer.

3,730,826

BORON CARBIDE BALLISTIC ARMOR MODIFIED WITH CALCIUM BORIDE, TITANIUM AND/OR MANGANESE

Ben Matchen and David Robertson, Niagara Falls, Ontario, Canada, assignors to Norton Research Corporation (Canada) Limited, Niagara Falls, Ontario, Canada

No Drawing. Filed Nov. 22, 1971, Ser. No. 201,121

Int. Cl. B32b *1/12, 17/10;* C04b *41/04*

U.S. Cl. 161—193 **9 Claims**

Composite ceramic armor with improved ballistic properties. Basic boron carbide armor is improved by the

addition to the boron carbide of certain quantities of calcium boride, titanium and/or manganese, or a combination of one or more of these with chromium or boron. Improved ballistics also result from a multilayer ceramic face plate wherein one or more layers of the above modified boron carbide is combined with a layer of boron carbide to form an integral ceramic face plate.

3,730,827

BORON CARBIDE BALLISTIC ARMOR MODIFIED WITH COPPER

Ben Matchen, David Robertson, and John J. Scott, Niagara Falls, Ontario, Canada, assignors to Norton Research Corporation (Canada) Limited, Niagara Falls, Ontario, Canada

No Drawing. Filed Nov. 22, 1971, Ser. No. 201,115

Int. Cl. B32b *1/12, 17/10;* **C04b** *41/04*

U.S. Cl. 161—193 **7 Claims**

Composite ceramic armor with improved ballistic properties. Basic boron carbide armor is improved by the addition to the boron carbide of certain quantities of copper or copper admixed with calcium boride, titanium, manganese, boron or chromium. Improved ballistics also result from a multilayer ceramic face plate wherein one or more layers of the above modified boron carbide is combined with a layer of boron carbide to form an integral ceramic face plate.

3,730,828

POSTFORMABLE LAMINATE COMPRISING A BARRIER SHEET OF WOOD FIBER IMPREGNATED WITH FULLY CURED UNPLASTICIZED MELAMINE-FORMALDEHYDE RESIN

Kenneth D. Meiser, Dallas, Tex., assignor to Plastics Manufacturing Company, Dallas, Tex.

Continuation-in-part of Ser. Nos. 535,733, March 21, 1966, abandoned, and Ser. No. 9,456, Feb. 6, 1970, abandoned. This application March 23, 1971, Ser. No. 127,412

Int. Cl. B32b *27/10*

U.S. Cl. 161—258 **5 Claims**

A laminate which is postformable to an arc of a circle having a radius at least as small as three-fourths inch without cracking or dulling of the surface is produced with a paper barrier sheet of wood fiber impregnated with a fully cured unplasticized malamine-formaldehyde resin by consolidating under heat and pressure a postformable substrate in direct contact with a paper barrier sheet consisting essentially of alpha cellulose impregnated with an unplasticized reaction product of formaldehyde and malamine in a mole ratio from 1.1:1 to 1.8:1. The reaction product has an acidity high enough to compensate for its low formaldehyde content, so as to cause it to become fully cured during the heat-and pressure-consolidation.

3,730,829

STARCH XANTHATE DERIVATIVES USED IN PAPERMAKING

George G. Maher, Dunlap, Ill., assignor to the United States of America as represented by the Secretary of Agriculture

No Drawing. Filed Oct. 18, 1971, Ser. No. 190,319

Int. Cl. D21h *3/28*

U.S. Cl. 162—175 **6 Claims**

A method of preparing paper is disclosed which includes the step of adding to the paper pulp the products of the reaction of starch xanthate with either an alkyl diglycidal ether or an alkyl diepoxide to thus increase, burst, wet and dry strength and fold endurance of the paper. This reaction may take place ex or in situ.

3,730,830

PROCESS FOR MAKING PAPER

William T. Driscoll, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

No Drawing. Filed Nov. 24, 1971, Ser. No. 202,013

Int. Cl. D21h *5/12*

U.S. Cl. 162—146 **12 Claims**

Paper particularly useful as photographic paper base is made by preparing a slurry in water of a mixture of a synthetic polymer staple fiber, such as a linear polyester, carboxymethyl cellulose and an inorganic pigment such as titanium dioxide or clay or carbon, blending the slurry with cellulose fiber before or after refining the cellulose fiber and forming a sheet of paper from the blend. The inorganic pigment tends to prevent agglomeration of the polymer fibers and allows a polymer slurry of relatively high consistency to be prepared for blending with the cellulose fibers.

3,730,831

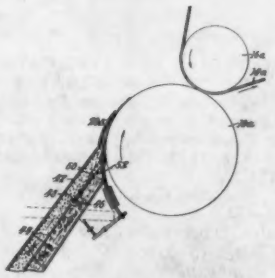
ADJUSTABLE SLICE FOR CYLINDRICAL ROLL FORMER

Samuel S. Stevens, P.O. Box 218, Erving, Mass. 01344

Filed Dec. 1, 1970, Ser. No. 94,043

Int. Cl. D21f *1/60*

U.S. Cl. 162—321 **5 Claims**



In a cylindrical roll paper forming machine, a generally fixed upper apron former in gradually approaching association with respect to the surface of the roll, in combination with a lower slice lip member between the apron former and the roll, said slice lip member being longitudinally adjustable toward and from the apron former on an arc, selectively increasing or decreasing the size of the throat.

The same construction including a pair of separate stock feeding conduits for feeding stocks of different types to the roll, and a free moving, free-ended paddle-like member having its free end adjacent the adjustable slice member, and automatically conforming to the slice adjustment to provide for applying a uniform dual layer of different types of stock onto the roll regardless of the adjustment of the slice member.

3,730,832

NUCLEAR REACTOR FUEL CHARGING AND DISCHARGING SYSTEM

William N. Jackomis, Fairborn, Ohio, assignor to the United States of America as represented by the Secretary of the Air Force

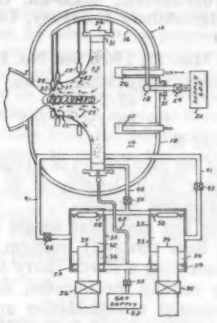
Filed June 23, 1971, Ser. No. 155,741

Int. Cl. G21 *19/20*

U.S. Cl. 176—30 **3 Claims**

A nuclear reactor fuel charging and discharging system for colloid core reactors having fuel stored in containers

in the shape of cyclone type separators. Valves positioned external to the reactor are opened to permit a gas flow through the containers to carry the nuclear fuel into the reactor cavity through a slot positioned near the periphery of the reactor cavity. A second set of valves



positioned external to the reactor are opened, and the first valves are closed to remove the nuclear fuel from the reactor cavity. The nuclear fuel is separated from the gas which carries the fuel to the storage containers in the cyclone type separators.

3,730,833

SCAVENGERS FOR RADIOACTIVE IODINE

George E. Cremeans, Groveport, David A. Berry and Harvey S. Rosenberg, Columbus, Joseph M. Genco, Gahanna, and David L. Morrison, Columbus, Ohio, assignors to the United States of America as represented by the United States Atomic Energy Commission

No Drawing. Continuation-in-part of application Ser. No. 803,465, Feb. 28, 1969. This application May 17, 1971, Ser. No. 144,298

Int. Cl. G21c *13/10*

U.S. Cl. 176—37 **3 Claims**

A surface coating for absorbing radioactive vapor-phase iodine and radioactive vapor-phase methyl iodide to be applied to the inside of a containment vessel for a water-cooled power reactor. The active ingredients of the surface coating may be polyacrylamines and combinations of polyacrylamines and amine-terminated polyamides. The active polymer ingredients are cross-linked to provide the physical characteristics necessary to withstand the environmental conditions present in a containment vessel subsequent to a loss-of-coolant accident.

3,730,834

GAS INJECTION SYSTEM FOR DUST CORE REACTOR

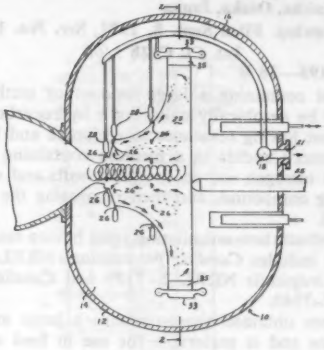
Bobby N. Turman, Fairborn, Ohio, assignor to the United States of America as represented by the Secretary of the Air Force

Filed May 4, 1971, Ser. No. 140,177

Int. Cl. G21c *19/28*

U.S. Cl. 176—45 **1 Claim**

A hydrogen gas injection system for a dust core reactor having a plurality of closely spaced thin arcuate vane sections positioned around the reactor cavity, with the spacing between the vanes being less than 10 times the slot width between the vanes. Each of the vanes have flat surfaces near the slots to enhance surface attachment of the gas jet.



3,730,835

NOVEL DEVICE COATED WITH A PROSTAGLANDIN AND PREPARATION THEREOF

Harold M. Leeper, Palo Alto, and Peter W. Ramwell, Portola Valley, Calif., assignors to ALZA Corporation

Filed Apr. 15, 1971, Ser. No. 134,222

Int. Cl. A61f *1/24*; A61m *5/14*; A61n *5/18*

U.S. Cl. 195—1.7 **13 Claims**

A device for adding a platelet anti-aggregation prostaglandin to a fluid containing platelets, or to platelets, the device comprising a substrate of increased surface area coated with a platelet anti-aggregation prostaglandin that releases the prostaglandin on contact by the fluid or platelet. The device is prepared by shaping and depositing a prostaglandin on the substrate by evaporation, solution deposition, coating in a fluidized bed and the like.

3,730,836

PROCESS FOR PRODUCING ADENOSINE BY FERMENTATION

Kenichi Komatsu and Akira Saijo, Miyazaki, Katsuji Haneda, Saitama, and Ryoji Kodaira and Hiroshi Ohsawa, Miyazaki, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

No Drawing. Filed Nov. 20, 1970, Ser. No. 91,524

Claims priority, application Japan, Dec. 24, 1969, 44/103,388

Int. Cl. C12d *13/06*

U.S. Cl. 195—28 N **5 Claims**

A process for producing purine nucleoside, i.e. adenosine, which is a useful substance as precursors of nucleotides having flavoring properties or as precursors of energy supplying sources in living bodies, by fermentation. In the process new strain identified at ATCC No. 21616, which is derived from a parent strain named as Bacillus No. ASB–5741 (ATCC No. 21615) belonging to a new species of the genus Bacillus are cultivated in a culture medium under aerobic conditions to accumulate the purine nucleoside in the culture medium.

3,730,837

PROCESS FOR PRODUCING YEAST WITH INCREASED METHIONINE CONTENT

Takashi Iguchi, Shiro Hayakawa, and Hiroshi Ohosawa, Miyazaki, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

No Drawing. Filed Sept. 8, 1971, Ser. No. 178,812

Int. Cl. C12b *1/00*

U.S. Cl. 195—28 R **7 Claims**

A yeast containing a large amount of methionine is produced by aerobically culturing a hydrocarbon-assimilating yeast having resistance to ethionine and belonging to the genus Candida in a medium containing a hydrocarbon, a nitrogen source, inorganic salts and a growth-promoting compound, and then recovering the resulting yeast cell.

The hydrocarbon-assimilating yeast having resistance to ethionine includes *Candida petrophilum* NRRL Y–7338, *Candida tropicalis* NRRL Y–7339 and *Candida rugosa* NRRL Y–7340.

The thus obtained yeast contains a large amount of methionine and is preferable for use in feed and foodstuffs.

3,730,838

ENZYMATIC PREPARATION OF L-CITRULLINE

Ichiro Chibata, Suita-shi, Toshio Kakimoto, Sakai-shi, Takeji Shibatani and Noriyuki Nishimura, Kobe-shi, Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

No Drawing. Filed Mar. 2, 1971, Ser. No. 120,368

Claims priority, application Japan, Mar. 14, 1970, 45/21,861

Int. Cl. C12d *13/06*

U.S. Cl. 195—29 **10 Claims**

An L-arginine deiminase-producing microorganism selected from the group consisting of *Pseudomonas fluorescens, Pseudomonas ovalis, Pseudomonas pavonacea, Pseudomonas putida, Leuconostoc citrovorum, Leuconostoc mesenteroides, Sarcina lutea, Streptomyces griseus, Mycobacterium smegmatis* and *Mycobacterium avium* is cultivated in an aqueous nutrient medium and under aerobic conditions. The cultivation is preferably carried out at about 30–37° C. A fermentation broth is produced. The broth is incubated with L- or DL-arginine. Alternatively a refined aqueous preparation produced from the broth may be employed. The incubation is preferably carried out at 25–40° C. and at pH 4.5–7.0. L-citrulline is recovered from the resultant reaction mixture.

3,730,839

PROCESS FOR PREPARING NOVENAMINE

Oldrich K. Sebek, and Herman Hoeksema, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 829,757, June 2, 1969, Pat. No. 3,652,536. This application Dec. 13, 1971, Ser. No. 207,580

Int. Cl. C12d *13/02*

U.S. Cl. 195—29 **18 Claims**

Novel process for enzymatic cleavage of 3-acylamino-4-hydroxy coumarins such as are found in some antibiotic substances. Process yields amine compounds having antibiotic properties per se and/or utility as intermediates to make antibiotically active substances. Examples of compounds which can be used as starting materials in the subject process and their amine cleavage products are as follows:

Novobiocin → novenamine

Dihydronovobiocin → novenamine

Isonovobiocin → isonovenamine

Descarbamoyl novobiocin → descarbamoyl novenamine

Descarbamoyl dihydronovobiocin → descarbamoyl novenamine

3,730,840

PROCESS FOR PREPARING LOW MOLECULAR WEIGHT AMYLOSES

Kaname Sugimoto, Mamoru Hirao, and Mikihiko Yoshida, Okayama, Makoto Shiosaka, Fukuoka-shi, and Yasuyuki Yokobayashi, Sakai-shi, Osaka, Japan, assignors to Hayashibara Company, Okayama-shi, Okayama, Japan

Filed Mar. 25, 1969, Ser. No. 810,314

Claims priority, application Japan, Apr. 1, 1968, 43/21,365

Int. Cl. C13l *1/00*

U.S. Cl. 195—31 R **4 Claims**

A process for the preparation of straight-chain amyloses having molecular chain lengths of 20 to 30 that have never been obtainable hitherto.

Straight-chain low molecular weight amyloses wherein the molecules have relatively uniform chain length are obtained by liquefying a starch slurry to a relatively low extent, rapidly cooling the liquefied slurry before there occurs a substantial retrogradation and selectively decomposing and cutting the α-1,6-glucoside bonds of amylopectin contained in the starch.

3,730,841

ENCAPSULATED CARRIER BOUND ENZYMES

Peter Salvatore, Forgione, Stamford, Conn.; Rocco Albert Polistina, Port Chester, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed March 24, 1971, Ser. No. 127,752

Int. Cl. C07g *7/02*

U.S. Cl. 195—63 **10 Claims**

Enzymes bound to carriers can be maintained active and the channelling and compacting of the bound enzyme can be substantially reduced by encapsulating the bound enzyme in a coating through which the substrate and its conversion product are permeable.

3,730,842

PROCESS FOR DETERMINING BACTERIAL DRUG SENSITIVITY

Philip J. Wyatt and Richard M. Berkman, Santa Barbara, and David T. Phillips, Goleta, Calif., assignors to Science Spectrum, Santa Barbara, Calif.

Filed May 4, 1970, Ser. No. 34,243

Int. Cl. C12k *1/04*

U.S. Cl. 195—103.5 R **21 Claims**

There is described a method of rapidly determining the sensitivity of bacteria to one or more antibiotic agents. The process involves subjecting the test bacteria to a highly directional narrow beam of light and measuring the intensity of the scattered light as a function of scattering angle and repeating the measurement at successive time intervals to determine the changes in the pattern of scattered light intensity. Sensitivity of the bacteria to the antibiotic agent results in a very noticeable change in the light scattering pattern produced by the bacteria.

3,730,843

MASS SCREENING TEST FOR SERUM TRYPSIN INHIBITORS

James E. McKie, Jr., Parsippany, N.J., assignor to Pfizer Inc., New York, N.Y.

Filed Dec. 14, 1970, Ser. No. 98,213

Int. Cl. C12k *1/04*

U.S. Cl. 195—103.5 R **11 Claims**

A diagnostic test package for use in an improved semi-quantitative method for estimating antitrypsin levels in human blood.

3,730,844

POLYNUCLEOTIDE ANALYSIS

Peter Thomas Gilham, and Herbert Lee Weith, both of West Lafayette, Ind., assignors to Purdue Research Foundation, Lafayette, Ind.

Filed Aug. 27, 1971, Ser. No. 175,756
Int. Cl. G01n *31/14*
U.S. Cl. 195—103.5 R **4 Claims**

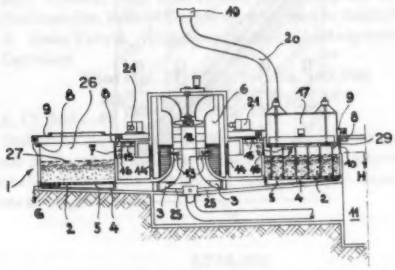
Sequential analysis of a polynucleotide to determine the particular order of nucleoside units therein can be conveniently carried out by adsorbing a polynucleotide on a strongly basic anion-exchange material, oxidizing the terminal nucleoside of the polynucleotide with a periodate, removing any excess periodate by reaction with L-rhamnose, treating the adsorbed polynucleotide with an amine to remove the terminal nucleoside residue from the polynucleotide molecule and with a phosphatase to remove the resulting terminal phosphate group from the remaining polynucleotide molecule, separating the so-produced nucleoside residue from the adsorbed polynucleotide for subsequent identification and then repeating the above procedure for each remaining nucleoside unit of the polynucleotide.

3,730,845

INSTALLATION FOR PRODUCING MALT

Rolf Schultz, Duisburg, Germany, assignor to Rheinstahl Wanheim Gesellschaft mit beschrankter Haftung, Duisburg-Wanheim, Germany

Filed Apr. 15, 1969, Ser. No. 816,282
Claims priority, application Austria, Apr. 16, 1968, A 3,687/68
Int. Cl. A23l *1/46*; C12c *1/00*
U.S. Cl. 195—129 **8 Claims**



An installation for producing green or cured malt having a closed annular chamber, an annular conduit below the floor of the chamber and sloping radially inwardly and downward to form an annular pipe which extends upward through the center of the annular chamber to an air conditioning unit which is connected back to the chamber above a predetermined level for the steeping water.

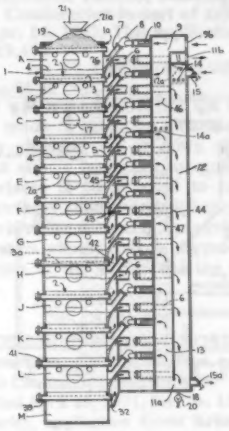
3,730,846

APPARATUS FOR MALTING GRAIN

Gerhart Neubert, Duisberg-Beeck, Germany, assignor to Rheinstahl Wanheim G.m.b.H., Duisburg-Wanheim, Germany

Application Sept. 30, 1969, Ser. No. 862,384, which is a continuation-in-part of application Ser. No. 595,527, Nov. 18, 1966, both abandoned. Divided and this application Aug. 21, 1970, Ser. No. 66,057
Int. Cl. A23l *1/00*; C12c *1/00*
U.S. Cl. 195—129 **5 Claims**

Production of malt utilizing a vertical malting tower having a plurality of normally horizontal troughs with perforated strainers to support a quantity of grain, the troughs including imperforate bottoms and peripheral sealing means to define separate treatment spaces in vertical array, with means for individually tilting each trough about a horizontal axis to drop the grain to successive treatment spaces. The preferred process comprises steeping the grain to about 38 percent water content, partially germinating the steeped grain, resteeping the partially germinated grain, aerating the grain, and repeating the resteeping and aerating at least once to produce a steeped grain with a water content of at least about 48 percent, and allowing such grain to germinate further.

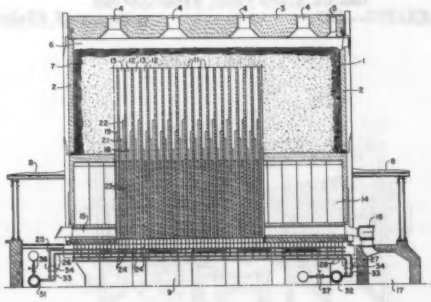


3,730,847

PLURAL GAS MAINS FOR INDEPENDENTLY OPERATING LOW AND HIGH BURNERS IN ALTERNATIVE FLUE

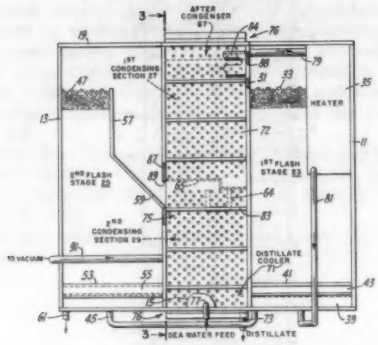
Eriche E. Pries and Rolf Rossow, Bochum, Germany, assignors to Dr. C. Otto & Comp. G.m.b.H., Bochum, Germany

Filed Dec. 7, 1970, Ser. No. 95,613
Int. Cl. C10b *5/12*
U.S. Cl. 202—139 **1 Claim**



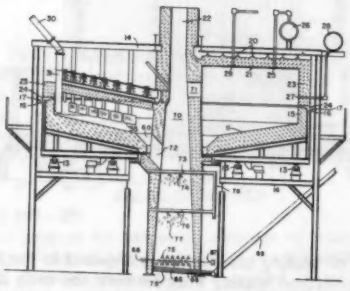
A group of heating gas burners is disposed in the lower ends of the vertical heating flues between the oven chambers in a row of coke ovens. Another group of heating gas burners is disposed in the same flues at a higher level than the first group. Connected to each of the groups of burners is a heating gas distribution conduit with its own pressure control valve, so that the pressure of the gas supplied to one of the groups of burners can be regulated independently of the pressure of the gas supplied to the other group of burners.

3,730,848
MULTI-STAGE FLASH EVAPORATOR FOR DISTILLING BRINES
Valentine Walter Kowalski, East Lyme, Conn., assignor to Riley-Beaird, Inc., Chicago, Ill.
Filed Aug. 21, 1970, Ser. No. 65,999
Int. Cl. B01d *3/00, 3/10, 3/02*
U.S. Cl. 202—173 **11 Claims**



This application covers a flash evaporator having two flash stages connected in series and condensing stages located between the flash stages, the condensing stages being stacked one on the other. The first condensing stage includes an after condenser and the second condensing stage an integral distillate cooler. In addition, a heater is integrally mounted in the upper portion of the first flash stage. An evaporator, in accordance with the invention, presents no hot walls for salt buildup. Vapor and distillate flow countercurrent to infeed.

3,730,849
INTEGRAL CALCINED COKE COOLER
Victor D. Allred, Littleton, Colo., assignor to Marathon Oil Company, Findlay, Ohio
Filed Nov. 13, 1970, Ser. No. 89,320
Int. Cl. C10b *7/00, 49/06, 39/00*
U.S. Cl. 202—103 **5 Claims**

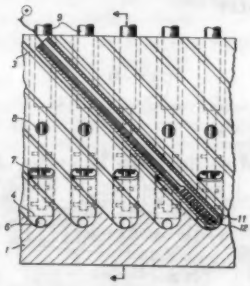


A heat exchanger, e.g., a series of transverse heat-conductive conduits through which fluid circulates, or a conventional waste heat boiler, or a water spray can be incorporated into a soaking pit in a rotary hearth calcining furnace. The soaking pit can also be made integral with the flue.

3,730,850
REMOVAL OF ODOR-CAUSING MATERIALS FROM SULPHUR-CONTAINING PLASTICIZERS BY DISTILLATION WITH A HYDROCARBON
Rector P. Louthan, Bartlesville, Okla., assignor to Phillips Petroleum Company
Filed Apr. 17, 1970, Ser. No. 29,634
Int. Cl. B01d *3/34;* **C07c** *149/02*
U.S. Cl. 203—52 **10 Claims**

Objectionable odor is substantially removed from plasticized sulfur-containing compositions by a process comprising admixing certain high-boiling inert solvents with partially-reacted plasticizer and stripping out the high boiling inert solvent under reduced pressure while completing the plasticizer preparation.

3,730,851
METHOD FOR THE CONTINUOUS SEPARATION OF PLUTONIUM FROM URANIUM IN THE TWO-PHASE SYSTEM BY MEANS OF ELECTROLYTIC REDUCTION
Eduard Schwind, Karlsruhe, and Peter Schlosser, Leopoldshafen, Germany, assignors to Gesellschaft für Kernforschung m.b.H., Karlsruhe, Germany
Filed Feb. 5, 1970, Ser. No. 9,010
Claims priority, application Germany, Feb. 5, 1969, P 19 05 519.7
Int. Cl. B01k *3/00*
U.S. Cl. 204—1.5 **8 Claims**



A method of separating uranium compounds and plutonium compounds by liquid-liquid extraction in which the plutonium is reduced to the trivalent stage by electrolytic reduction, with the plutonium being reduced during the extraction process in a region of thorough mixing of aqueous and organic phase and separated together with the aqueous phase.

3,730,852
MANUFACTURE OF ABRASION-RESISTANT MAGNETIC RECORDING MEDIA
Adolf Diebold, Ludwigshafen, Richard Sinn, Ziegelhausen, and Georg Schnell, Ludwigshafen, Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen am Rhine, Germany
No Drawing. Filed Nov. 9, 1971, Ser. No. 197,152
Int. Cl. C23f *17/00, 5/32, 5/26*
U.S. Cl. 204—38 B **7 Claims**

The invention relates to a process for the manufacture of magnetic recording media having thin metallic ferromagnetic coatings.

The magnetic recording media are manufactured by treating a substrate having a coating consisting of a dispersion of particulate iron or zinc in a binder such that electroless deposition of copper takes place by displacement of the iron or zinc, which copper coating may be

thickened by electrodepositing copper or silver thereon. A ferromagnetic coating consisting of cobalt and nickel and additionally phosphorus, copper or zinc and/or manganese and optionally iron is electrodeposited on the copper layer.

The process of the invention produces magnetic recording media with thin metallic coatings of high abrasion resistance which cause minimum head wear and have a high storage capacity.

3,730,853

ELECTROPLATING BATH FOR DEPOSITING TIN-LEAD ALLOY PLATES

Friedrich Sedlacek and Joachim Korpiun, Geislingen, Steige, Germany, assignors to Dr.-Ing. Max Schloetter, Fabrik fuer Galvanotechnik, Geislingen, Steige, Germany

No Drawing. Filed June 18, 1971, Ser. No. 154,658

Int. Cl. G01n *5/38, 5/40*

U.S. Cl. 204—43 **18 Claims**

Semibright to bright deposits of tin-lead alloys on articles are produced by electroplating the articles with an electroplating bath comprising a tin compound, a lead compound, preferably the fluoborates of stannous tin and plumbous lead, fluoboric acid, boric acid, a wetting agent, and, as brightening agent, a methylene aniline compound or a diamino diphenylmethane compound, preferably in combination with a brightener as conventionally used in electroplating tin baths.

3,730,854

STABILIZED AQUEOUS SOLUTIONS OF UNSATURATED ALIPHATIC SULFONIC ACIDS OR SALTS THEREOF

Walter Schenk, Bad Duerkheim, and Friedrich Hovemann, Hockenheim, both of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen/Rhein, Germany

Filed Oct. 29, 1971, Ser. No. 193,996

Int. Cl. C23b *5/46;* **C07c** *143/16*

U.S. Cl. 204—49 **6 Claims**

Stabilized aqueous solutions of aliphatic unsaturated sulfonic acids which contain aliphatic chlorine compounds, and nickel-plating baths containing said stabilized aqueous solutions as brighteners.

3,730,855

METHOD AND COMPOSITION FOR ELECTROPLATING ZINC

John Gove Poor, Somers, and George Bernard Rynne, Rockville, Conn., assignors to Conversion Chemical Corporation, Rockville, Conn.

No Drawing. Continuation-in-part of abandoned application Ser. No. 711,504, Mar. 8, 1968, which is a continuation-in-part of abandoned application Ser. No. 626,951, Mar. 30, 1967. This application Dec. 18, 1968, Ser. No. 784,917

Int. Cl. C23b *5/10, 5/46*

U.S. Cl. 204—55 R **33 Claims**

An aqueous bath for producing ductile, adherent zinc electrodeposits upon metallic surfaces contains ammonium chloride, zinc chloride and a surface active component comprising a mixture of surface active agents including a primary surface-active agent selected from the group consisting of sulfated polyoxyalkyl carbinamines, condensate of alkyl phenols and an alkylene oxide, imidazoline derivatives, and mixtures thereof. In addition, a secondary surface-active agent is desirably included such as phosphoric acid esters of polyalkylene glycols and alkoxylated alkyl phenols and the alkali metal salts of such esters, polyoxyalkyl carbinamines, natural phosphatides and mixtures thereof. The bath has a pH of 3.0 to 10.0 and may additionally contain aldehyde brighteners, buffering and chelating agents, and secondary brighteners.

3,730,856

ELECTROLYTIC PREPARATION OF VALVE GROUP METAL EQUIPMENT FOR USE IN CHEMICAL PLANTS

John Grahame Hines, Runcorn, and Joseph Bernard Cotton, Sutton Coldfield, England, assignors to Imperial Chemical Industries Limited, London, England

No Drawing. Continuation-in-part of application Ser. No. 630,850, Apr. 14, 1967. This application Feb. 26, 1971, Ser. No. 119,415

Int. Cl. C23b *9/00, 3/00*

U.S. Cl. 204—56 R **8 Claims**

Equipment which is intended for use in chemical plant and which is made of titanium, zirconium, niobium, tantalum or any alloy of one or more of these metals, is exposed to an anodic treatment to remove heavy metals from the surfaces to be exposed to chemicals to thus protect the surfaces against embrittlement caused by hydrogen which is either present in the environment to which the equipment is exposed or is formed as a result of corrosive action at the surface of the metal.

3,730,857

PRODUCTION OF ALKOXIDES

Terence Gordon Tripp, Chester, England, assignor to Monsanto Chemicals Limited, London, England

Filed April 26, 1971, Ser. No. 137,613

Claims priority, application Great Britain, May 5, 1970, 21,644/70

Int. Cl. C07b *29/06;* **C07f** *7/04, 7/00*

U.S. Cl. 204—59 R **8 Claims**

This invention relates to the production of alkoxides by passing an electric current through a liquid medium comprising a solution of a monohydric alcohol and as a supporting electrolyte an ammonium or quaternary ammonium salt using an anode and passing the electric current through the medium until the alkoxides are present in the liquid medium.

3,730,858

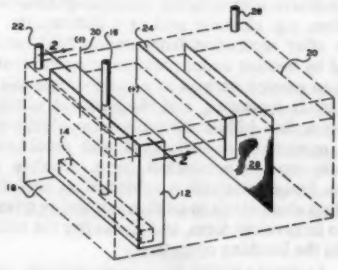
POROUS ELECTRODE HAVING CAVITY WITH IMPERVIOUS DOME

Keith A. Williams, Bartlesville, Okla., assignor to Phillips Petroleum Company

Continuation of application Ser. No. 74,133, Sept. 21, 1970, which is a continuation of abandoned application Ser. No. 739,506, June 24, 1968. This application Feb. 14, 1972, Ser. No. 226,040

Int. Cl. B01k *3/00;* **C07b** *29/06*

U.S. Cl. 204—59 R **14 Claims**



In an electrochemical process, the reaction takes place within the confines of a porous electrode element. The bottom of this electrode element has a cavity open to the bulk of the electrolyte. Gaseous or vaporous feed materials are introduced into this cavity; a portion of the inner surfaces of the walls of this cavity are sufficiently impervious so as to cause a gas cap to form in the upper

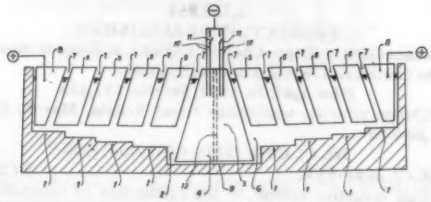
portion of the cavity. This allows the feed materials to be distributed evenly throughout the entire horizontal span of the cavity. The feed materials then pass out of the impervious dome and into and upward through the porous reaction section of the electrode without contact with the bulk of the electrolyte and are converted to the desired products while within the confines of the electrode element.

3,730,859

MULTICELL FURNACES FOR THE PRODUCTION OF ALUMINUM BY ELECTROLYSIS

Giuseppe de Varda, Milan, Italy, assignor of a fractional part interest to Montecatini Edison S.p.A., Milan, Italy

Filed June 26, 1970, Ser. No. 50,050
Claims priority, application Italy, June 30, 1969, 18,962/69
Int. Cl. C22d *3/12, 3/02*
U.S. Cl. 204—67 **9 Claims**



A multicell furnace having inclined bi-polar electrodes for electrolytic production of aluminum. A terminal cathode is situated over a metal collection pit in the sloped vat bottom. The cathode extends into the collection pit whereby it contacts the molten metal.

3,730,860

ELECTROLYTIC RECOVERY OF COPPER FROM OXIDIZABLE CUPRIFEROUS MATERIAL

Frank E. Horton, Sonora, Mexico, and Thomas M. Morris, Tucson, and Frank E. Christman, Inspiration, Ariz., assignors to Inspiration Consolidated Copper Company, New York, N.Y.

Filed Feb. 18, 1972, Ser. No. 227,592
Int. Cl. C22d *1/16, 15/08*
U.S. Cl. 204—108 **19 Claims**

Oxidizable iron-bearing cupriferous material is leached with a sulfuric acid solution containing hexavalent chromium ions, e.g. chromic acid or a dichromate. The leach solution after separation from undissolved residue is hydrolyzed by heating under pressure at a temperature above 130° C. to precipitate iron as a basic sulfate salt. The iron precipitate is separated, and the residual solution is subjected to a first bifluid electrolysis to electrowin copper and to regenerate sulfuric acid and reoxidize trivalent chromium ions to hexavalent form. Anolyte discharged from the first electrolysis is subjected as anolyte in a second bifluid electrolysis to oxidize remaining trivalent chromium to hexavalent form, and thereafter the solution is recycled to the leaching operation.

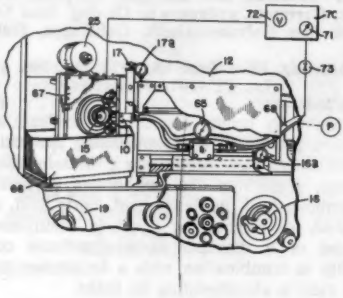
3,730,861

METHOD OF ELECTROCHEMICAL MACHINING

William Andrew Haggerty, Cincinnati, Ohio, assignor to The Cincinnati Milling Machine Co., Cincinnati, Ohio

Filed Apr. 8, 1968, Ser. No. 719,450
Int. Cl. C23b *3/02, 3/12;* **B23k** *1/00*
U.S. Cl. 204—129.75 **9 Claims**

A method of electrochemical machining workpieces to form surfaces of revolution having precise shapes and dimensions includes the steps of rotating the workpiece and positioning an electrochemical machining tool adjacent the workpiece with the gap between the tool and the workpiece being adjusted initially to a first distance. A high velocity flow of electrolyte is forced under pressure into the gap between the tool and the workpiece to provide a path for the electrical current, to remove the heat generated during the machining operation, and to remove the reaction products of the machining operation. The current density between the workpiece and the tool is maintained at the highest possible level for substantially the entire machining operation, in the order of 6000 amperes per square inch, to obtain the highest quality surface finish and the best machining rates. After the workpiece has been machined to its finish dimension, the current may be reduced momentarily, for at least one revolution of the workpiece to a lower predetermined level, typically between 1500 and 3000 amperes per square inch, to produce a bright, pleasing appearance to be machined surface. The current is then terminated abruptly in order to maintain this bright surface appearance completely around the bearing surface.



3,730,862

PREPARATION OF LIQUID BROMINE-TERMINATED POLYMERS

Alan A. Csontos, Norton, Ohio, assignor to The B. F. Goodrich Company, New York, N.Y.

No Drawing. Filed June 21, 1971, Ser. No. 155,325
Int. Cl. B01j *1/10*
U.S. Cl. 204—163 R **5 Claims**

Liquid bromine-terminated polymers are directly prepared as by polymerizing one or more acrylates, acrylates in combination with isoprene, or butadiene with acrylonitrile using a combination of ultraviolet light and a dibromo-dichloro alkane containing at least two carbon atoms only as the polymerization initiator. These polymers are vulcanized with polyfunctional amines as curing agents to form solid elastomers, and are useful as base polymers for caulks, sealants, potting compounds, and like formulations.

3,730,863

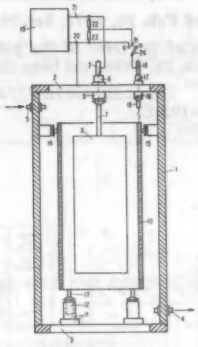
METHOD OF TREATING WORKPIECES IN A GLOW DISCHARGE

Klaus Keller, Paulstrasse 4, Cologne, Weiss, Germany

Filed Feb. 10, 1971, Ser. No. 114,162
Claims priority, application Switzerland, Feb. 13, 1970, 2,093/70; Jan. 5, 1971 42/71
Int. Cl. C23c *11/16*
U.S. Cl. 204—164 **5 Claims**

In nitriding ferrous workpieces in a glow discharge the workpiece and the container constitute the glow discharge electrodes during normal operation. A third electrode is

positioned between the workpiece and container and is provided with a heat reflecting surface facing the workpiece. During starting, the third electrode is held at a po-



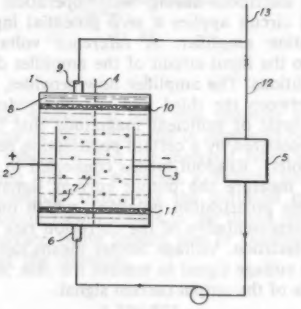
tential lower than that of the container to provide a low energy glow discharge to the workpiece and is later connected to the container to be at the same potential.

3,730,864

DECREASING THE PHENOLIC CONTENT OF LIQUIDS BY AN ELECTROCHEMICAL TECHNIQUE

Michael Tarjanyi, North Tonawanda, and Murray P. Strier and Howard D. Siegerman, Amherst, N.Y., assignors to Hooker Chemical Corporation, Niagara Falls, N.Y.

Filed Apr. 14, 1971, Ser. No. 133,918
Int. Cl. B01k *3/00;* **C02c** *5/12*
U.S. Cl. 204—149 **15 Claims**



A method for decreasing the phenolic content of a solution which comprises passing an electric current through a solution containing phenolic material, which solution is contained as the electrolyte in a cell, said cell having at least one positive and one negative electrode, between which the current is passed, and wherein the electrolyte also contains a bed of particles, distributed therein, such that the porosity of the bed is from about 40 to 80%, porosity being defined as

$$\left(1-\frac{\text{Volume of particles}}{\text{Volume of cell wherein the particles are distributed}}\right)\times 100$$

The electrolysis of the electrolyte is continued until the desired reduction in the phenolic content thereof is obtained.

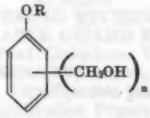
3,730,865

ELECTRODEPOSITION OF A COMPOSITION CONTAINING AN ESTER RESIN AND A METHYLOLPHENOL ETHER

Erwin J. Kapalko and William H. English, Delaware, Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

No Drawing. Continuation of abandoned application Ser. No. 748,953, July 31, 1968. This application Aug. 12, 1971, Ser. No. 171,380
Int. Cl. B01k *5/02;* **C23b** *13/00*
U.S. Cl. 204—181 **7 Claims**

Electrodepositable coating compositions having outstanding detergent resistance and other improved properties are provided by a combination of a vehicle resin which is a mixed partial ester of a resinous polyol containing free carboxyl groups, said polyol having a portion of its hydroxyl groups esterified with fatty acid and at least a portion of the remaining hydroxyl groups esterified with an unsaturated fatty acid alpha, beta-ethylenically unsaturated carboxylic acid anhydride adduct, said adduct forming the ester, then the anhydride ring of the adduct; and a methylolphenol ether composition of the formula:



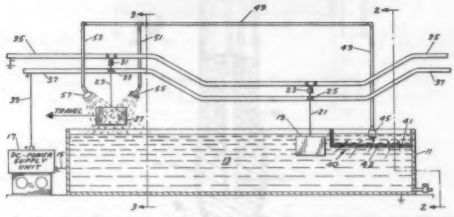
where *n* is 1 to 3 and R is an unsaturated aliphatic group or a halogenated derivative of such a group. The properties of these coating compositions make them highly useful on appliances such as laundry equipment, particularly as primers.

3,730,866

CATHOLYTE RINSE OF ELECTROCOAT

Leopold A. Madejczyk, Oak Park, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 24, 1969, Ser. No. 887,949
Int. Cl. B01d *13/02;* **B01k** *5/02;* **C23b** *13/00*
U.S. Cl. 204—181 **4 Claims**



An improved method for electrodepositing paint upon an electrically conductive substrate from an aqueous dispersion of such paint is provided wherein catholyte liquid is separated from the coating bath and discharged upon an article which has been coated in and removed from such bath with such article positioned in a manner such that the liquid so discharged returns to the coating bath.

3,730,867

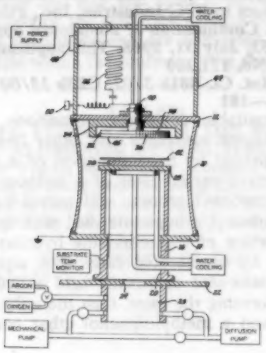
RF SPUTTERING OF TETRAGONAL GERMANIUM DIOXIDE

Walter A. Albers, Jr., Northville, Carl E. Bleil, Birmingham, and Don E. Swets, Sterling Heights, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 26, 1970, Ser. No. 83,779
Int. Cl. C23c *5/00*
U.S. Cl. 204—192 **4 Claims**

Films of the non-naturally occurring, tetragonal, crystalline form of germanium dioxide are directly deposited

on any substrate in a controlled radio frequency sputtering process. The film is sputtered from a cooled tetragonal



germanium dioxide target onto a cooled substrate at a low rate in a non-reducing atmosphere.

3,730,868

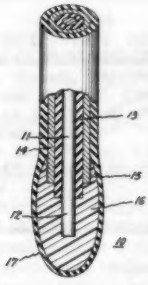
CARBON DIOXIDE SENSOR

Leonard W. Niedrach, Schenectady, N.Y., assignor to General Electric Company

Filed Dec. 21, 1970, Ser. No. 100,126

Int. Cl. G01n *27/46*

U.S. Cl. 204—195 P **3 Claims**



A carbon dioxide sensor has an elongated flexible current collector with at least an exterior surface of gold or a noble metal on the current collector, an electrochemically active region of a quinone and a hydroquinone in electrical contact with a portion of the current collector, a second elongated flexible current collector surrounding at least partially the first current collector, a second electrochemically active region of silver and silver halide in electrical contact with the second current collector, a first layer of electrical insulation disposed between the first and second current collectors, a second layer of electrical insulation disposed over the second current collector, an anion exchange resin electrolyte contacting both electrochemically active regions, and an outer sheath of carbon dioxide permeable, ion-impermeable diffusion barrier material encapsulating at least the electrochemically active regions and the electrolyte.

3,730,869

CORROSION RATEMETER

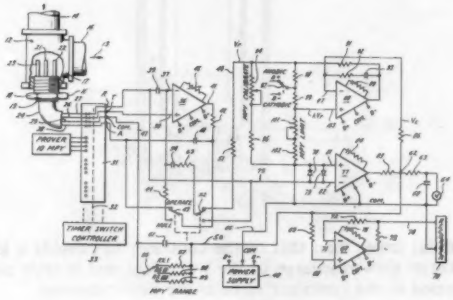
Homer M. Wilson, Houston, Tex., assignor to Petrolite Corporation, St. Louis, Mo.

Filed Feb. 16, 1971, Ser. No. 115,368

The portion of the term of the patent subsequent to Oct. 26, 1988, has been disclaimed

Int. Cl. G01n *27/46*

U.S. Cl. 204—195 C **14 Claims**



A corrosion ratemeter with test (specimen), reference and third electrodes contactable by a corrodent. An input circuit connects the test and reference electrodes to an isolation amplifier. The amplifier provides in its output circuit an output current signal representative of the potential difference between the test and reference electrodes. A capacitance means in series with the input circuit is charged to the freely corroding potential representative of the potential difference between the test and reference electrodes during "null" operation. As a result, the input circuit applies a zero potential input signal to the isolation amplifier. A reference voltage signal is applied to the input circuit of the amplifier during "operate" conditions. The amplifier now provides, in its output circuit between the third and test electrodes, an output current signal of sufficient magnitude that the test electrode is polarized by a certain polarization potential (e.g., 10 millivolts). Readout means connected to the isolation amplifier measure the output current signal representative of this polarization potential, which output current signal is representative of the corrosion rate occurring at the test electrode. Voltage limiter means can provide the reference voltage signal to control the rate of change and magnitude of the output current signal.

3,730,870

TOOL FOR ELECTROLYTICALLY HONING SPHERICAL SURFACES

Albert Grosseau, Chaville, France, assignor to Societe Anonyme Automobiles Citroen, Paris, France

Filed June 29, 1971, Ser. No. 157,980

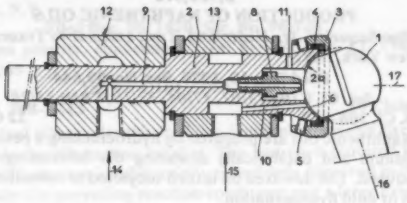
Claims priority, application France, July 3, 1970, 7024678

Int. Cl. B23p *1/10;* **C23b** *5/72;* **B01k** *3/00*

U.S. Cl. 204—224 **3 Claims**

A tool for honing spherical surfaces by electrolytic action includes a concave spherical surface connected as one electrode whilst the spherical surface to be honed is connected as the other electrode. The spherical surface of the tool is encircled by a ring member faced with an

abrasive surface and the latter lies within the imaginary surface of the sphere. A sensing nozzle is disposed on the



common axis of the tool and spherical surface of the workpiece.

3,730,871

APPARATUS FOR MODIFYING A PROPERTY OF AN ARTICLE BY DIFFUSION

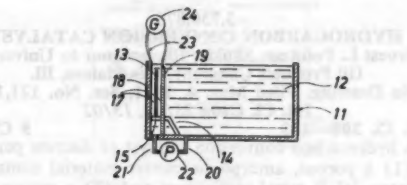
Maurice Boffe, Fleurus, Belgium, assignor to Glaverbel S.A., Watermael-Boitsfort, Belgium

Continuation of abandoned application Ser. No. 722,379, Apr. 18, 1968. This application Apr. 8, 1971, Ser. No. 132,595

Claims priority, application Luxembourg, Apr. 27, 1967, 53,530; Great Britain, Jan. 15, 1968, 2,167/68

Int. Cl. C22d *3/02*; **C03c** *15/00*

U.S. Cl. 204—245 **10 Claims**



In processes wherein at least one property of a glass, vitrocrystalline or stone material is improved by the diffusion of a substance into the material from a medium communicating with the material, a method and apparatus for substantially improving the diffusion process by preventing nonuniform changes in the liquid medium adjacent the surface being treated due to random currents in the rest of the medium.

3,730,872

ELECTRIC CELLS

Xavier Marze, Rhone, France, assignor to Rhone-Poulence S.A., Paris, France

No Drawing. Filed May 25, 1971, Ser. No. 146,827

Claims priority, application France, May 27, 1970, 7019358

Int. Cl. B01k *3/10*

U.S. Cl. 204—252 **9 Claims**

Electric cells are provided at least one partitioning membrane, at least one membrane consisting essentially of a copolymer derived from at least two, monomers, one of which is acrylonitrile and one of which, is an olefinically unsaturated monomer containing a sulphonic acid group which may be salified, the latter monomer being present in an amount between about 0.4 and about 2 millimols per gram of copolymer and having the formula:

$$C(R_3)=C(R)-A-SO_3H$$

in which each R radical, which may be the same or different, represents hydrogen or an alkyl radical of up to 4 carbon atoms; and A represents:

(i) a divalent wholly hydrocarbon group, the free valencies of which are carried by a wholly aliphatic, saturated or unsaturated, straight or branched chain radical or by an aromatic nucleus, or one of the free valencies of which is carried by an aliphatic carbon atom and the other free valency of which is carried by an aromatic carbon atom,

or (ii) a —O—A'— or —S—A'— group, in which A' represents a group as defined under (i),

or (iii) a divalent radical consisting of aliphatic and/or aromatic groups linked to one another by oxygen or sulphur atoms, the free valencies of which are carried by aliphatic and/or aromatic carbon atoms,

or (iv) a group as defined under (i), (ii) or (iii) wherein one or more of the carbon atoms thereof is substituted.

3,730,873

CATHODE SPUTTERING ETCHING DEVICE WITH MOVABLE GUARD RING

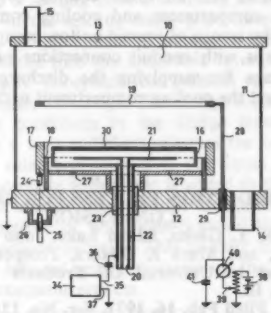
Jean Pompei and Paul Guiochon, Evreux, France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 18, 1971, Ser. No. 125,731

Claims priority, application France, Mar. 18, 1970, 7009665

Int. Cl. C23c *15/00*

U.S. Cl. 204—298 **9 Claims**



A device for engraving objects by cathodic sputtering including a cathode, which serves as the object holder, an anode, a vertically movable guard ring laterally surrounding the cathode, and an annular auxiliary electrode electrically insulated from the other electrodes and spaced from the cathode. A suitable potential is applied to the latter auxiliary electrode to correct ion trajectories and thereby improve engraving produced by ion bombardment of the object surface.

3,730,874

TUBULAR-SHAPED OZONIZER POSSESSING COOLED INNER ELECTRODE

Hannes Trüb, 95 Hoschgasse, 8008 Zurich, Switzerland

Filed Nov. 22, 1971, Ser. No. 200,701

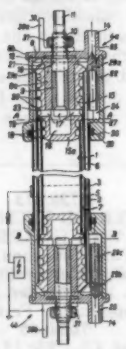
Claims priority, application Switzerland, Dec. 1, 1970, 17,798/70

Int. Cl. C01b *13/12*

U.S. Cl. 204—321 **8 Claims**

A tubular-shaped ozonizer of the type equipped with a cooled inner electrode and a dielectric tube concentri-

cally arranged between the inner electrode and an outer electrode. The tubular-shaped inner and outer electrodes and the dielectric electrode are held and maintained in spaced relationship from one another by electrically insulating closure cap members mounted at their ends. According to the invention, the space between the inner electrode and the outer electrode which is of substantially circular-shaped cross-sectional configuration is subdivided by the dielectric tube into an outer discharge



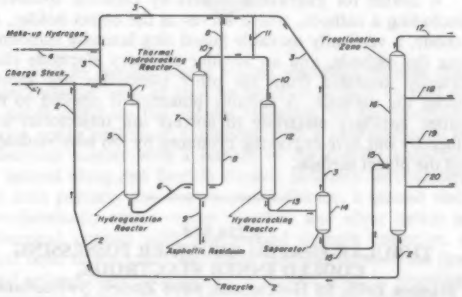
compartment and an inner cooling compartment. The discharge compartment and cooling compartment communicate by means of spaced hollow compartments of the closure caps with conduit connections provided at such closure caps for supplying the discharge compartment with air and the cooling compartment with a cooling fluid medium.

3,730,875

COMBINATION PROCESS FOR BLACK OIL CONVERSION

William K. T. Gleim, Island Lake, John G. Gatsis, Des Plaines, and Mark J. O'Hara, Prospect Heights, Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed Feb. 16, 1971, Ser. No. 115,352
Int. Cl. C10g *13/06, 23/02, 37/00*
U.S. Cl. 208—57 **7 Claims**



A hydrocarbonaceous black oil is converted into lower-boiling hydrocarbon products in a combination process involving catalytic hydrogenation, non-catalytic hydrogenative thermal cracking and catalytic hydrocracking.

3,730,876

PRODUCTION OF NAPHTHENIC OILS

Avilino Sequeira, Jr., Nederland, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Dec. 18, 1970, Ser. No. 99,644
Int. Cl. C10g *13/02, 37/04, 37/10;* **C01b** *33/28*
U.S. Cl. 208—59 **12 Claims**

Naphthenic oils are prepared by hydrocracking a petroleum residuum and catalytically dewaxing the lubricating oil so produced. The dewaxed oil is then subjected to solvent extraction or mild hydrogenation.

3,730,877

PROCESS FOR THE PREPARATION OF BASE OILS FOR THE PRODUCTION OF LUBRICATING OIL

Willem C. J. Quik and Pieter A. van Weeren, Amsterdam, Netherlands, assignors to Shell Oil Company, New York, N.Y.

No Drawing. Filed Dec. 5, 1968, Ser. No. 781,628
Int. Cl. C10g *23/04*
U.S. Cl. 208—143 **4 Claims**

High viscosity index lubricating base oils are prepared by treating paraffinic-naphthenic oils having a low aromatic content and a high content of naphthenes with condensed rings with hydrogen in the presence of platinum on alumina catalyst containing not more than 4% wt. of an alkali or alkaline earth metal at a hydrogen partial pressure above 10 kg./cm.^{2} and a temperature of at least 345° C.

3,730,878

HYDROCARBON CONVERSION CATALYST

Ernest L. Pollitzer, Skokie, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

No Drawing. Filed Mar. 4, 1971, Ser. No. 121,127
Int. Cl. C10g *23/02, 13/02*
U.S. Cl. 208—143 **9 Claims**

A hydrocarbon conversion catalyst of discrete particles of (1) a porous, amorphous carrier material containing a Group VI–B metal component and (2) a porous, zeolitic carrier material containing a Group VIII metal component. Suitable for utilization in a multitude of hydroprocesses, wherein there is effected the chemical consumption of hydrogen, the principal advantage of the catalyst resides in its use for hydrotreating hydrocarbonaceous charge stocks.

3,730,879

TWO-BED CATALYST ARRANGEMENT FOR HYDRODESULFURIZATION OF CRUDE OIL

Robert D. Christman, Pittsburgh, George E. Elliott, Oakmont, and Guglielmo Guelfi, Pittsburgh, Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Nov. 19, 1970, Ser. No. 90,964
Int. Cl. C10g *23/02*
U.S. Cl. 208—210 **7 Claims**

A two-bed hydrodesulfurization of crude oil or reduced crude oil containing the asphaltene fraction of the crude is carried out with catalytic particles of a Group VI and Group VIII metal supported on a non-cracking alumina. In the first bed at least 50% of the total pore volume of said catalyst has pores with radii in the 50–100 angstrom range; in the second bed less than 45% of the total pore volume of said catalyst has pores with radii in the 50–100 angstrom range. The higher percentage of pores in the first bed provides increased sulfur selectivity while the lesser percentage of pores in the second bed provides enhanced aging characteristic for the combined catalyst beds.

3,730,880

RESIDUAL OIL HYDRODESULFURIZATION PROCESS

Lambertus J. Van der Toorn, and Heinz Voetter, both of Amsterdam, Netherlands, assignors to Shell Oil Company, New York, N.Y.

Filed Dec. 10, 1970, Ser. No. 96,920
Claims priority, application Great Britain, Dec. 12, 1969, 60,647/69
Int. Cl. C10g *23/02, 23/06*
U.S. Cl. 208—213 10 Claims

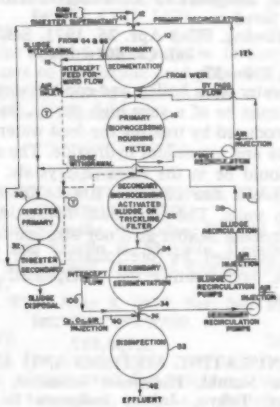
Residual oils are desulfurized in a liquid phase over a fixed-bed hydrodesulfurization catalyst. The hydrogen required for the desulfurization is substantially completely dissolved in the oils under the prevailing reaction conditions and a large external product recycle (10:1 on fresh feed) is applied. Fresh catalyst is periodically introduced at the top of the reactor and spent catalyst is withdrawn at the bottom thereof. An apparatus for carrying out the process is also described.

3,730,881

WASTE WATER TREATMENT SYSTEM

Edward T. Armstrong, 490 Pepperidge Tree Terrace, Butler, N.J. 07405

Continuation-in-part of application Ser. No. 813,382, Feb. 28, 1969, now Patent No. 3,549,528, dated Dec. 22, 1970, which is a continuation-in-part of abandoned application Ser. No. 362,118, Apr. 23, 1964. This application Dec. 21, 1970, Ser. No. 100,333
Int. Cl. C02c *1/08*
U.S. Cl. 210—6 24 Claims



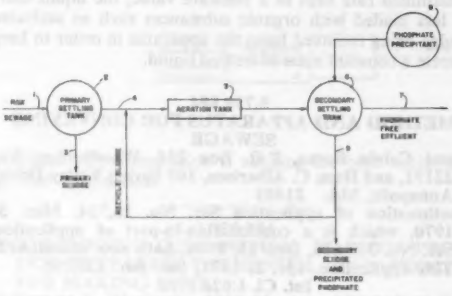
The invention represents a new concept in liquid processing particularly in sewage treatment utilizing air, oxygen or a carrier gas with ozone as an attenuator of anaerobic biota, for generalized disinfection, for aeration, or for oxygenation. Essentially, unique designs and/or processes are incorporated into the conventional settling tanks associated with sewage treatment, as well as in the bioprocesses, activated sludge or trickling filter operations. The structural improvements in settling reduce velocity, inhibit boundary layer separation and act to suppress mixing of the sewage to greatly enhance solid and fluid separation, while in the bioprocessing operations, the key is to improve efficiency of the liquid-gas exchange whereby much better oxygen contact is achieved. The liquid-gas exchange feature utilizes a high momentum exchange under turbulent flow conditions in a hydraulic pressure gradient to achieve intimate mixing of the desired gas in the fluid so as to achieve the desired very reliable and efficient liquid-gas exchange.

3,730,882

INTERNAL PRECIPITATION OF PHOSPHATE IN SETTLING ZONE

Gilbert V. Levin, Chevy Chase, and George J. Topol, Silver Spring, Md., assignors to Biospherics Incorporated, Rockville, Md.

Filed June 13, 1972, Ser. No. 262,190
Int. Cl. C02c *1/06*
U.S. Cl. 210—6 6 Claims



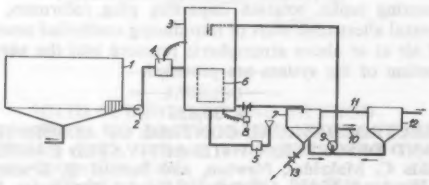
There is disclosed an activated sludge sewage treatment process which comprises mixing influent sewage material with activated sludge to provide a mixed liquor. The mixed liquor is passed to an aeration zone wherein it is aerated to reduce the BOD content thereof and to cause the microorganisms present to take up phosphate. The mixed liquor is then passed to a settling zone containing an anaerobic layer of sludge. In the settling zone, phosphate-enriched sludge, in which the phosphate is present in the cells of the organisms, settles into the anaerobic layer of sludge and a substantially phosphate-free effluent is removed from above the layer of sludge. The sludge is maintained under anaerobic conditions in the sludge layer of the settling zone for a time sufficient to cause the organisms in the sludge to release phosphate to the liquid phase of the sludge. A phosphate precipitant is added to the sludge to precipitate the soluble phosphate in the phase thereof, resulting in a mixture of phosphate-depleted sludge and precipitated phosphate particles. This mixture is recycled for mixing with influent sewage material in the activated sludge sewage treatment process.

3,730,883

SEWAGE DISPOSAL METHOD

Louis Alfred Auguste Lefrancois, 24 Rue Barbet de Jouy, Paris, France

Filed Feb. 5, 1971, Ser. No. 112,901
Claims priority, application France, Feb. 13, 1970, 7005278; Jan. 15, 1971, 7101317
Int. Cl. C02c *1/06*
U.S. Cl. 210—7 17 Claims



In the treatment of waste waters, or sewage disposal process, according to the activated sludge and aërobial fermentation treatment method, the water to be cleaned is introduced continuously into a fermentation apparatus

with a constant output while blowing air continuously into this apparatus in order to keep throughout the liquid mass a substantial homogeneity of the liquid, solid and gaseous phases and ensure a maximum dispersion of the microorganisms, under constant medium conditions, air being blown into the apparatus for transforming the liquid mass into a constant volume of expanded liquid, notwithstanding variations in the liquid composition, the content of living microorganisms in the mass being increased by the addition of similar organic substances up to a predetermined rate kept to a constant value, the liquid more or less loaded with organic substances such as activated sludge being removed from the apparatus in order to keep therein a constant mass of treated liquid.

3,730,884

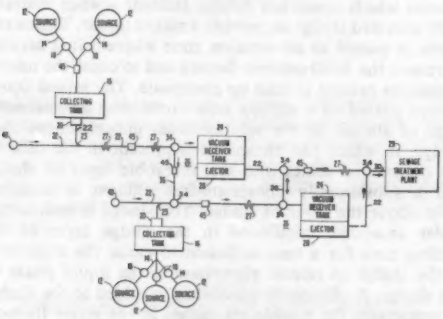
METHOD AND APPARATUS FOR CONVEYING SEWAGE

Bland Calvin Burns, P.O. Box 254, Woodbridge, Va. 22191, and Hans C. Albertsen, 105 Spring Valley Drive, Annapolis, Md. 21403

Continuation of application Ser. No. 16,734, Mar. 5, 1970, which is a continuation-in-part of application Ser. No. 767,626, Oct. 15, 1968, both now abandoned. This application Apr. 2, 1971, Ser. No. 130,791

Int. Cl. C02c *1/00*

U.S. Cl. 210—15 **48 Claims**



A method and apparatus for conveying sewage from sewage sources such as residences to a remote location, the sewage initially being conveyed by gravity flow from the source into a collecting tank and thereafter by vacuum induced plug flow to a vacuum receiver tank at the remote location. The sewage may thereafter be discharged from the remote location, preferably under positive pressure, into another line such as a vacuum line for further vacuum induced plug flow or a gravity flow conduit. The final location to which the sewage is conveyed may be the sewage treatment facility. Substances for treating the sewage may be advantageously introduced into the system and mixed with the sewage during conveyance. Self-scouring tanks, rotation imparting plug reformers, and several alternative ways of introducing controlled amounts of air at or above atmospheric pressure into the vacuum portion of the system are provided.

3,730,885

ELECTROCHEMICAL CONTROL OF ADSORPTION AND DESORPTION WITH ACTIVATED CARBON

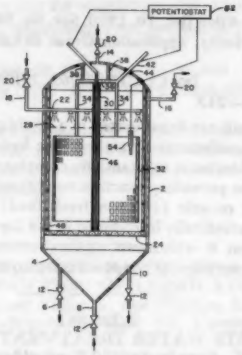
Alkis C. Makrides, Newton, and Samuel B. Brummer, Wayland, Mass., assignors to Tyco Laboratories, Inc., Waltham, Mass.

Filed Jan. 21, 1971, Ser. No. 108,267

Int. Cl. B01d *15/06;* **C02b** *1/14*

U.S. Cl. 210—30 **4 Claims**

Method and apparatus for controlling the adsorption-desorption behavior of activated carbon. Adsorption and desorption are controlled by controlling the potential at the interface between the carbon and the solution containing the species to be adsorbed or the solution into which the adsorbed species are to be desorbed.



3,730,886

METHOD OF PURIFYING WATER

Sten Harald Ahrland, Lund, Bengt Göran Fredrik Carleson, Nykoping, and Jarl Soren Lindhe, Tystberga, Sweden, assignors to Aktiebolaget Atomenergi, Stockholm, Sweden

No Drawing. Filed Apr. 26, 1971, Ser. No. 137,690

Int. Cl. B01d *15/04*

U.S. Cl. 210—37 **2 Claims**

Feed water for a boiler, and coolant water for a nuclear reactor, must be of a very high purity. Such a pure water can be produced by treating the feed water with zirconium phosphate and zirconium hydroxide. The zirconium phosphate should be in the form of crystals, the majority of which have a size of from 100 x 200 to 1000 x 2000 angstrom units. The zirconium hydroxide shall be neutral, i.e. release neither acid nor alkaline compounds. This can be achieved by precipitating the hydroxide with ammonia, and treating the precipitated hydroxide with ammonia.

3,730,887

GRANULATING METHOD AND APPARATUS

Hidetomo Suzuki, Hidenobu Arimitsu, and Shigemasa Tanaka, Tokyo, Japan, assignors to Ebara Infilco, Kabushiki Kaisha, Tokyo-to, Japan

Continuation of abandoned application Ser. No. 843,436, July 22, 1969. This application July 14, 1971, Ser. No. 162,700

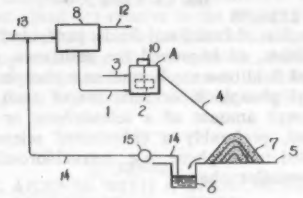
Claims priority, application Japan, Aug. 26, 1968, 43/73,461

Int. Cl. B01d *21/10;* **C02b** *1/20*

U.S. Cl. 210—45 **7 Claims**

The present invention proposes a granulating method and apparatus for shaping suspended solids in solution into granular solids. There is provided a solid-liquid separating tank into which a suspension containing suspensoid materials is introduced and separated into solid and liquid. Said tank is arranged such as not to form any obstacle in its interior and comprises inlet ports provided at a lower part of the tank for introducing, respectively, a suspension liquid and a high molecular compound into the tank, an outlet port provided at an upper part of the tank for discharging the liquid in the tank, and a swirling flow generating means adapted to produce a swirling flow in the liquid in said tank. It is essentially required to produce a swirling flow without forming a turbulent flow

in the liquid within the tank. This swirling flow is of different nature from a so-called agitation mixture flow. The tank is free of any obstacle which may disturb the swirling flow and has a configuration best suited for forming



such swirling flow. Arrangement is also made such that the suspension flows swirlingly with the high molecular compound material and is flown out in the form of slurry from the outlet provided at an upper part of the tank.

3,730,888

METHOD OF FLOCCULATING WITH TERTIARY AMINOHYDROXYALKYL ESTERS OF CARBOXYLIC ACID POLYMERS

John D. Buckman, Fred W. Raths, Pamela P. Boggs, and Robert L. Donerson, Memphis, Tenn., assignors to Buckman Laboratories, Inc., Memphis, Tenn.

No Drawing. Filed Apr. 19, 1971, Ser. No. 135,459

Int. Cl. C02b *1/20*

U.S. Cl. 210—52 **16 Claims**

High molecular weight, water-soluble tertiary aminohydroxyalkyl esters of carboxylic acid polymers prepared by reacting a glycidyl tertiary amine with a carboxylic acid polymer are useful flocculants.

3,730,889

FIRE-RESISTANT FUNCTIONAL FLUID COMPOSITIONS

Robert S. McCord, Pacific Palisades, Donald H. Nall, Los Angeles, and Martin B. Sheratte, Reseda, Calif., assignors to McDonnell Douglas Corporation, Santa Monica, Calif.

No Drawing. Filed May 3, 1971, Ser. No. 139,869

Int. Cl. C09k *3/00*

U.S. Cl. 252—78 **26 Claims**

Production of functional fluids, particularly aircraft hydraulic fluids, of improved fire resistance, comprising a functional fluid base stock, such as a phosphate ester, e.g., tri-n-butyl phosphate, or mixtures of such base stocks, and a small amount of a diseleno alkane compound, e.g., 3,8-diseleno-n-decane.

3,730,890

FIRE RETARDANT COMPOSITION AND METHOD OF PRODUCTION

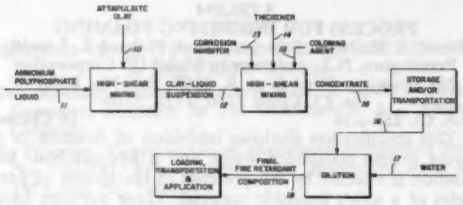
Kenneth E. Nelson, Phoenix, Ariz., assignor to Early California Industries Inc.

Continuation of abandoned application Ser. No. 36,064, May 11, 1970. This application Dec. 3, 1971, Ser. No. 204,724

Int. Cl. A62c *3/02*; A62d *1/00*

U.S. Cl. 252—7 **1 Claim**

Attapulgite clay is suspended in liquid ammonium polyphosphate to form a concentrate. Various components such as corrosion inhibitors, gum thickeners and coloring agents which are insoluble in the polyphosphate liquid are carried and maintained in suspension by the attapulgite clay. Upon dilution of the concentrate with water as required to produce a retardant composition with the desired viscosity, the components are uniformly dispersed and/or dissolved in the final fire-retardant com-



position. The composition is adapted for both aerial and ground application.

3,730,891

INTUMESCENT COMPOSITION, FOAMED PRODUCT PREPARED THEREWITH, AND PROCESS FOR MAKING SAME

Salvatore R. Riccitiello, 1950 Montemar Way, San Jose, Calif. 95125, and John A. Parker, 22938 McClure Lane, Los Altos, Calif. 94022

No Drawing. Filed May 6, 1971, Ser. No. 140,946

Int. Cl. C09k *3/28*

U.S. Cl. 252—8.1 **8 Claims**

An intumescent composition and the foamed product prepared by heating the composition are provided wherein the composition comprises the reaction product of para-benzoquinone dioxime and a concentrated mineral acid such as sulfuric acid, phosphoric acid, and polyphosphoric acid. The composition is useful as an intumescent agent either by itself or when combined with other materials. A fire-resistant and heat-insulating composition is provided by heating the intumescent composition above its intumescent temperature.

3,730,892

PRODUCTION OF POLYESTERS

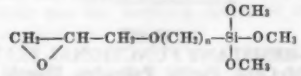
Robert Moore Marshall, Chester, and Kimon Constantine Dardoufas, Richmond, Va., assignors to Allied Chemical Corporation, New York, N.Y.

No Drawing. Filed Mar. 22, 1971, Ser. No. 126,963

Int. Cl. D06m *13/38*

U.S. Cl. 252—8.75 **9 Claims**

An improved multifilament polyethylene terephthalate yarn and process for producing said yarn, said yarn being combined with a compatible fiber finish composition of hexadecyl (isocetyl) stearate, coconut oil or mineral oil; glycerol monooleate; decaglycerol tetraoleate; polyoxyethylene tall oil fatty acid; sulfonated glycerol trioleate; polyoxyethylene tallow amine; 4,4′-thiobis (6-tert-butyl-m-cresol); and a silane having the structural formula



wherein n=2 to 5.

3,730,893

SOLID LUBRICANTS AND METHOD

Norman Bilow, Los Angeles, and John R. Jones, Pacific Palisades, Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Sept. 3, 1968, Ser. No. 756,799

The portion of the term of the patent subsequent to Feb. 1, 1989, has been disclaimed

Int. Cl. C10m *7/28, 7/04*

U.S. Cl. 252—12.4 **12 Claims**

Improved thermosetting bonded solid lubricants comprising essentially a polymer resin of over 90% carbon

and preferably polyphenylene polymers of at least about 94% carbon bonding of solid lubricant particulates, compositions therefor and method.

3,730,894
PROCESS FOR INHIBITING FOAMING
Israel J. Heilweil, Princeton, and Richard I. Leavitt, Pennington, N.J., assignors to Mobil Oil Corporation
No Drawing. Filed Sept. 8, 1969, Ser. No. 856,198
Int. Cl. C10m *1/50, 1/28, 1/06*
U.S. Cl. 252—16 **10 Claims**

This specification discloses inhibition of foaming in a liquid system containing water and a hydrocarbon. Inhibition is effected by the presence in the system of particles of a solid, insoluble material. These particles have a surface area of less than 50 square meters per gram and a portion of their surfaces is occupied by polar sites. Representative solid materials are poly-2,6-dimethyl-1,4-phenylene oxide, a copolymer of 2,6-dimethyl phenol and 2-methyl-1,6-tetradecyl phenol wherein the proportion of the latter compound does not exceed about 20 percent by weight of the copolymer, a copolymer of vinyl stearate and maleic anhydride, sublimed sulfur, silicon carbide, and polytetrafluoroethylene comminuted under cryogenic conditions.

3,730,895
CORROSION INHIBITING COMPOSITIONS
Manley Kjonaas, Hammond, Ind., assignor to Atlantic Richfield Company, New York, N.Y.
No Drawing. Filed Oct. 21, 1970, Ser. No. 82,800
Int. Cl. C10m *5/22, 5/14*
U.S. Cl. 252—18 **32 Claims**

Greases thickened with conventional grease thickeners and containing a cloudy-type overbased alkali metal or alkaline earth metal sulfonate or carboxylate dispersant and a water-soluble corrosion inhibiting salt.

Corrosion inhibiting concentrates are also set forth which comprise lubricating oil, cloudy-type over-based dispersants, and water-soluble corrosion inhibiting salts.

3,730,896
LOW TEMPERATURE GREASES
William P. Scott and Warren W. Woods, Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.
No Drawing. Continuation-in-part of application Ser. No. 860,091, Sept. 22, 1969. This application Sept. 10, 1971, Ser. No. 179,562
Int. Cl. C10m *7/30, 7/20*
U.S. Cl. 252—28 **10 Claims**

Di-n-alkylbenzene oils thickened with clays or metal soaps. The greases may also contain the rust-inhibiting combination of lead naphthenate, didodecyl dimethyl quaternary ammonium nitrite or nitrate, and a fatty imidazoline alkyl diamine dicaprylate.

3,730,897
FIRE-RESISTANT FUNCTIONAL FLUIDS
Robert S. McCord, Pacific Palisades, Donald H. Nail, Los Angeles, and Martin B. Sheratte, Reseda, Calif., assignors to McDonnell Douglas Corporation, Santa Monica, Calif.
No Drawing. Filed Mar. 29, 1971, Ser. No. 129,268
Int. Cl. C09k *3/00*
U.S. Cl. 252—78 **25 Claims**

Production of functional fluids, particularly aircraft hydraulic fluids, of improved fire resistance, comprising a functional fluid base stock, such as a phosphate ester, e.g., di-n-butyl phenyl phosphate, or mixtures of such base stocks, and a small amount of an aryl selenide compound, preferably a chlorinated aryl selenide, e.g., ethyl p-chloro phenyl selenide.

3,730,898
FUNCTIONAL FLUID COMPOSITIONS OF INCREASED FIRE RESISTANCE
Robert S. McCord, Pacific Palisades, Donald H. Nail, Los Angeles, and Martin B. Sheratte, Reseda, Calif., assignors to McDonnell Douglas Corporation, Santa Monica, Calif.
No Drawing. Filed June 21, 1971, Ser. No. 155,267
Int. Cl. C09k *3/00*
U.S. Cl. 252—78 **35 Claims**

Production of functional fluids, particularly aircraft hydraulic fluids, of improved fire resistance, comprising a functional fluid base stock, such as a phosphate ester, e.g., tri-n-butyl phosphate, or mixtures of such base stocks, and a small amount of a selenophene or tellurophene compound, preferably a chlorinated selenophene or a chlorinated tellurophene, e.g., tetrachloroselenophene or tetrachlorotellurophene.

3,730,899
POWDERLESS ETCHING BATH ADDITIVE
Harold J. Messerschmidt, Jr., Box 8M, R.D. 1, Stockholm, N.J.; Karl Heyman, 10 Crestmont Road, Montclair, N.J.; and Bernadou W. Johnsen II, 110 E. 23rd St., Apt. 3, Paterson, N.J.
No Drawing. Filed Sept. 24, 1971, Ser. No. 183,660
Int. Cl. B44n *3/02;* **C23g** *1/26*
U.S. Cl. 156—14 **12 Claims**

Etching bath for zinc and magnesium and alloys based thereon comprising an aqueous solution containing an etching amount of nitric acid, and a water-soluble or dispersible, anionic, aliphatic carboxylic acid containing at least one hydrophobic hydrocarbon group with about 8 to 24 carbon atoms and having a sulfonate group depending from a carbon atom in said hydrocarbon group.

3,730,900
COMPOSITION AND PROCESS FOR DRILLING SUBTERRANEAN WELLS
Alphonse C. Perricone and Homer F. Young, Houston, Tex., assignors to Milchem Incorporated, Houston, Tex.
No Drawing. Continuation-in-part of application Ser. No. 126,907, Mar. 22, 1971. This application Sept. 25, 1972, Ser. No. 291,778
Int. Cl. C10m *3/34*
U.S. Cl. 252—8.5 C **4 Claims**

A composition, additive, and process for the drilling of subterranean wells utilizing a low molecular weight styrene sulfonic acid-maleic anhydride copolymer as a colloidal stabilizer for aqueous drilling fluids. The composition, additive, and process are particularly effective when drilling under extremely high temperature and pressure environments.

3,730,901
COMPOSITION AND METHOD FOR REMOVING COPPER CONTAINING IRON OXIDE SCALES FROM FERROUS METALS
John A. Knox, John A. Smith, and Roy F. Stout, deceased, by Richard E. Dixon, executor, all of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.
No Drawing. Continuation-in-part of applications Ser. No. 56,987, July 6, 1970, and Ser. No. 138,410, Apr. 29, 1971, both now abandoned, and a division of application Ser. No. 248,136, Apr. 27, 1972. This application Apr. 27, 1972, Ser. No. 248,227
Int. Cl. C23g *1/04, 1/08*
U.S. Cl. 252—87 **8 Claims**

A method of and composition for removing copper and iron oxide containing incrustations from a ferrous metal surface so as to prevent or at least impede the formation of a curdy adhesive precipitate and utilize low ratios of copper complexor-to-copper.

A surface sought to be cleaned is contacted with an aqueous acid solution comprising a composite copper

complexor composed of (i) hexahydropyrimidine-2-thione present as a first copper complexor in a concentration of from about 80% to about 20% by weight of the mixed complexor, and (ii) thiourea present as a second copper complexor in a concentration of from about 20% to about 80% by weight of the composite complexor. The composite copper complexor is present in solution in a weight ratio of at least about 4:1 relative to the copper sought to be removed. The solution also includes an acid, selected from the group consisting of hydrochloric, sulfuric, sulfamic and phosphoric acids, and present in a concentration of from about 3% to about 30% by weight.

3,730,902

SCOURING AGENTS WITH A BLEACHING AND DISINFECTING ACTION

Karlheinz Disch, Hilden, Peter Krings, Krefeld, Dieter Kühling, Monheim, Horst Bellinger, Dusseldorf, and Johannes Jürgen Perner, Neustadt, Germany, assignors to Henkel & Cie GmbH, Dusseldorf, Germany

No Drawing. Filed Sept. 29, 1970, Ser. No. 76,612
Claims priority, application Germany, Oct. 1, 1969, P 19 49 561.5
The portion of the term of the patent subsequent to Dec. 28, 1988, has been disclaimed
Int. Cl. C11d *7/54*
U.S. Cl. 252—99 **9 Claims**

Scouring agents having a bleaching and disinfecting action comprising a major amount of water-insoluble scouring components and a minor amount of essentially water-soluble components including a solid water-soluble per-compound and an effective amount of acylated activator compounds wherein the acyl is selected from the group consisting of alkanoyl having 2 to 4 carbon atoms, benzoyl and substituted benzoyl, said acylated compounds are selected from the group consisting of N-acyl compounds, O-acyl compounds, carbonic acid esters and pyrocarbonic acid esters.

3,730,903

WETTING AGENTS FOR ALKALINE BATHS

Franz Landauer, Frankfurt am Main, Claus Beermann, Neu-Isenburg, Martin Reuter, Kronenberg, Taunus, Karl Heinz Lebkücher, Hofheim, Taunus, and Hubert Kiesling, Schwalbach, Taunus, Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt am Main, Germany

No Drawing. Continuation-in-part of application Ser. No. 701,119, Jan. 29, 1968. This application Dec. 17, 1970, Ser. No. 99,264
Claims priority, application Germany, Feb. 2, 1967, F 51,418
Int. Cl. C11d *7/12*
U.S. Cl. 252—156 **2 Claims**

Detergent mixtures consisting of: (a) an alkylsulfonic acid containing a sulfonic acid group per 7 carbon atoms at most, (b) a low-molecular oxalkylation product of a lower alkyl amine, and (c) a phosphate of alkanols of 4 to 8 carbon atoms are useful as surface active agents for alkaline baths.

3,730,904

HALOGENATED HYDROCARBON COMPOSITIONS AND USES THEREOF

John Joseph Clementson and Peter Graham Johnson, Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

No Drawing. Filed Apr. 17, 1970, Ser. No. 29,697
Claims priority, application Great Britain, Apr. 29, 1969, 21,814/69
Int. Cl. C09d *9/04*; C11d *7/52*; C23g *5/02*
U.S. Cl. 252—171 **13 Claims**

A composition comprising a chlorohydrocarbon or bromohydrocarbon solvent and a sodium, ammonium or amine salt of the monosulphonic acid derivative of a diester of a succinic acid in an amount of at least 0.5% by weight of the composition.

3,730,905

METHOD OF ENVELOPING THE PARTICLES OF A DISPERSED PHASE

Gotz Koerner, Essen, and Gerd Rossmy, Essen-Werden, Germany, assignors to Th. Goldschmidt AG, Essen, Germany

No Drawing. Continuation of abandoned application Ser. No. 796,932, Feb. 5, 1969. This application June 4, 1971, Ser. No. 150,227
Int. Cl. B01j *13/02*; B44d *1/02*
U.S. Cl. 252—316 **10 Claims**

Process of enveloping the particles of a phase dispersed in water by forming a boundary layer—capable of stabilization—around the particles. During or after the preparation of the dispersion, emulsifiers containing at least one hydrophilating group and at least one silyl group having at least one hydrolyzable group attached to the silicon atom of the silyl group, are added, whereupon the hydrolyzable groups are hydrolyzed and the silanols thus formed are condensed. If only a single hydrolyzable group is present, the dispersion is enriched by a silane containing hydrolyzable groups. The hydrophilating group is selected from the group consisting of polyethylene oxide units, quaternary ammonium salt groups and amino salt groups of sulfuric acid esters in which the sulfuric acid ester group is linked to a silicon atom of the siloxane structure through carbon. The hydrolyzable groups are halogen, acyloxy, alkoxy, ≡Si—N=,

$$\equiv Si-O-N=$$

or

$$\equiv Si-O-\overset{\overset{O}{\|}}{C}-O-,$$

wherein the free valences at N and O are satisfied by hydrocarbon.

3,730,906

CRUDE OIL DEMULSIFIERS

Knut Oppenlaender, Ludwigshafen, Gert Liebold, Mannheim, and Egon Buettner, Ludwigshafen, Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

No Drawing. Filed Mar. 15, 1971, Ser. No. 124,574
Claims priority, application Germany, Mar. 23, 1970, P 20 13 823.2
Int. Cl. B01d *17/04*
U.S. Cl. 252—342 **7 Claims**

Crude oil demulsifiers based on esterification products of rosin with oxyalkylated alkylphenol/formaldehyde resins and their use for breaking crude oil emulsions at ambient temperatures.

3,730,907

PROCESS OF PRODUCTION OF DEFOAMER COMPOSITIONS

Hugh J. S. Shane, John E. Schill, and John W. Lilley, Guelph, Ontario, Canada, assignors to Hart Chemical Limited, Guelph, Ontario, Canada

No Drawing. Filed Dec. 21, 1971, Ser. No. 210,547
Int. Cl. B01d *17/00*
U.S. Cl. 252—358 **17 Claims**

A defoamer composition is prepared by a series of steps including forming a mixture of an aliphatic diamide and a low viscosity mineral oil in which the aliphatic diamide

has a particular size of from 4 to 7 on the Hegman scale, and ageing the mixture at an elevated temperature and over an extended period of time while agitating the mixture.

3,730,908

AMINE CURING AGENTS FOR POLYEPOXIDE COMPOSITIONS

James R. Harvey, Somerville, N.J., assignor to Union Carbide Corporation, New York, N.Y.

No Drawing. Original application June 22, 1970, Ser. No. 48,471. Divided and this application Aug. 9, 1971, Ser. No. 170,303

Int. Cl. C08g *30/14*

U.S. Cl. 252—426 17 Claims

This invention relates to mixtures of a polyglycol polyamine and an alkylene polyamine, which when added to polyepoxides provide compositions which are useful in coating, casting or filament winding applications to form articles of desired shape, which when cured to infusible products, are characterized by excellent flexibility and toughness and by excellent surface characteristics.

3,730,909

HYDRAZINE DECOMPOSITION CATALYST

Warren E. Armstrong, Lafayette, and Hervey H. Voge, Berkeley, Calif., assignors to Shell Oil Company, New York, N.Y.

No Drawing. Filed Apr. 5, 1966, Ser. No. 540,413

Int. Cl. B01j *11/82*

U.S. Cl. 252—434 5 Claims

Improved catalysts for the decomposition of hydrazine and lower alkyl-substituted hydrazines comprise a platinum group metal catalyst in combination with a solid oxidizer hypergolic on a porous, inorganic solid support.

3,730,910

NOVEL ZEOLITE SURFACES

Edwin W. Albers, Annapolis, and Grant C. Edwards, Silver Spring, Md., assignors to W. R. Grace & Co., New York, N.Y.

No Drawing. Filed Feb. 11, 1971, Ser. No. 114,737

Int. Cl. B01j *11/40*

U.S. Cl. 252—455 Z 27 Claims

Aluminosilicates, and particularly those of the zeolite class, are formed on substrate surfaces. These substrate surfaces include those of fibers, pills, extrusions, pellets or those on bulk structures such as laminates, composites, rods, bricks, tubes, tiles, blocks, honeycomb structures, monoliths and so on. The shape and structure can be of essentially any variation. Suitable substrate surfaces are those of inorganic oxides which include glasses, silicas, aluminas, aluminosilicates, germanias, zirconias, magnesias, titanias, and mixtures and combinations of these materials. The process of forming aluminosilicates on these surfaces comprises either (i), contacting the substrate surface with an aluminosilicate, (ii), contacting the substrate surface with an alkaline sodium silicate-sodium aluminate aluminosilicate or zeolite yielding mixture, or (III), contacting the substrate surface with a silicate or aluminate solution of a composition sufficient to produce a particular aluminosilicate with components on the surface of the substrate. This surface aluminosilicate or zeolite produced can then be ion exchanged or impregnated with any desired elements or chemicals for catalytic or adsorption uses, or otherwise utilized for its novel surface features in composites or other structures.

3,730,911

HEATING ELEMENT COMPRISING LANTHANUM CHROMITE AND OXIDATION-RESISTANT SILICON COMPOUND

Gérard Aubin, Evreux, and David Yerouchalmi, Le Mesnil Saint-Denis, France, assignors to Commissariat a l'Energie Atomique, Paris, France

No Drawing. Filed Oct. 4, 1971, Ser. No. 186,425

Claims priority, application France, Oct. 5, 1970, 7035867

Int. Cl. H01b *1/06*

U.S. Cl. 252—516 1 Claim

A heating element which is electrically conductive from room temperature to at least 2000° C. in an oxidizing atmosphere and over a long period of time, the element being formed from a lanthanide chromite which is combined with a variable proportion of an oxidation-resistant silicon compound.

3,730,912

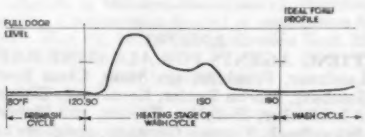
TERNARY FOAM CONTROL SYSTEMS AND DETERGENT COMPOSITIONS CONTAINING SAME

Jack Thomas Inamorato, Westfield, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation-in-part of application Ser. No. 41,359, May 28, 1970. This application May 28, 1970, Ser. No. 41,358

Int. Cl. B01d *19/04*; C11d *1/52, 1/62*

U.S. Cl. 252—528 35 Claims



A detergent composition having an inverse foam to temperature relationship is disclosed, as well as a ternary composition for accomplishing this relationship when added to a detergent system. The inverse foam to temperature relationship is provided by a synergistic mixture of a fatty acid, a polyethoxylated quaternary ammonium salt, and a high molecular weight amide or a primary, secondary or tertiary amine.

3,730,913

SYNTHETIC DETERGENT COMPOSITIONS

Yoichi Oba, Hachioji, Chiharu Kato, Tokorozawa, Teruo Tsunoda, Tokyo, and Shun Fujiki and Hajime Tsukuni, Hitachi, Japan, assignors to Hitachi, Ltd., and Hitachi Chemical Company, Ltd., both of Tokyo, Japan

No Drawing. Filed Feb. 2, 1971, Ser. No. 112,060

Claims priority, application Japan, Feb. 2, 1970, 45/8,460

Int. Cl. C11d *1/12, 3/26, 7/32*

U.S. Cl. 252—541 9 Claims

Detergent compositions comprising an anionic or nonionic surface active agent and a water-soluble salt of a copolymer of 3a,4,5,6,7,7a-hexahydro-4,7-methanoindene and maleic anhydride as a builder.

3,730,914

MIXED ALUMINUM SILICON COATINGS COMPOSITIONS

James Patrick Dowd, % Napko Corporation, 5300 Sunrise St., Houston, Tex. 77021

No Drawing. Continuation-in-part of abandoned application Ser. No. 13,859, Feb. 24, 1970. This application Sept. 17, 1971, Ser. No. 181,578

Int. Cl. C08g *31/04*

U.S. Cl. 260—2 S 3 Claims

Stable polymers are formed when alkoxy aluminum chelates are heated with alkyl alkoxy silicon derivatives. The hard resinous materials thus produced are soluble in a wide variety of organic solvents.

These polymers are particularly useful as binders for metallic pigmented coatings.

3,730,915

BI-2-OXAZOLINE AND OXAZINE COMPOUNDS DERIVED FROM CYANOETHYLATED POLY (ETHYLENE AND PROPYLENE) GLYCOLS

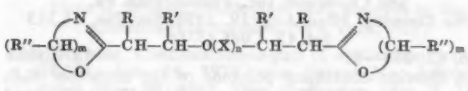
Donald A. Tomalia and David P. Sheetz, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

No Drawing. Application Mar. 29, 1971, Ser. No. 129,262, which is a continuation-in-part of abandoned application Ser. No. 835,910, June 19, 1969. Divided and this application Feb. 8, 1972, Ser. No. 224,587

Int. Cl. C08g *30/14*

U.S. Cl. 260—2 N 1 Claim

Bi-2-oxazoline and oxazine compositions derived from cyanoethylated poly(ethylene and propylene) glycols and having the formula:



where R, R′, and R″ can be H or alkyl containing from 1 to 4 carbon atoms, where X is (C_2H_4O) or (C_3H_6O), where n is a value from 1 to 50 inclusive and where m is 2 or 3.

3,730,916

PROCESS OF TREATING MICROCELLULAR POLYMERIC STAPLE FIBERS TO RENDER THEM POSTINFLATABLE

Arthur William Etchells III, Philadelphia, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

No Drawing. Filed July 13, 1971, Ser. No. 162,281

Int. Cl. C08j *1/26*

U.S. Cl. 260—2.5 N 6 Claims

An improved process is provided for introducing impermeant inflatant into the cells of a closed-cell polymeric foamed structure. Prior-art processes include treatment of the structure with (1) "plasticizing" liquid, which plasticizes the cell walls to permit fluids to diffuse into the cells, (2) "boosting" liquid containing impermeant inflatant, which diffuses into the cells while the walls are plasticized, but normally does not permeate the cells when the walls are not plasticized, and (3) "stripping" liquid, which removes the plasticizing liquid, deplasticizes the cell walls and traps impermeant inflatant within the cells. Fibers so treated become fully inflated when exposed to air. The improvement in this process comprises treating the foamed structure with plasticizing and boosting liquids that are dispersed and/or dissolved in water at concentrations below 10%, and preferably below about 3%.

3,730,917

SELF-EXTINGUISHING POLYURETHANE FOAM COMPOSITE AND BINDER COMPOSITION THEREFOR

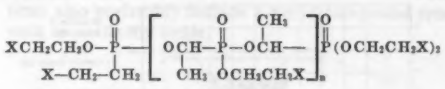
Robert G. Hesskamp, St. Louis, Mo., assignor to M R Plastics and Coatings, Inc., Maryland Heights, Mo.

No Drawing. Filed July 31, 1970, Ser. No. 60,098

Int. Cl. C08g *22/44, 51/30, 51/58*

U.S. Cl. 260—2.5 AK 7 Claims

A self-extinguishing flexible composite material useful as carpet padding, for example, is prepared by binding together particulate polyurethane foam material using a fire retardant binder composition comprising an isocyanate compound, a urethane prepolymer consisting of the reaction product of an isocyanate compound with a polyether polyol, and a fire retardant represented by the formula:



where X is chlorine or bromine and n is an integer between 0 and 6, inclusive. Methods of preparing the self-extinguishing composite are described. By use of optimum amounts of the fire retardant, increased tensile strength is also imparted to the composite.

3,730,918

MICROPOROUS PARTICULATE THERMOPLASTIC POLYMER COMPOSITION

John Teti, Wilmington, Del., and Jerome Carlton Violette, Freehold, N.J., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed June 10, 1971, Ser. No. 151,648

Int. Cl. C08j *1/26*

U.S. Cl. 260—2.5 M 14 Claims

A microporous particulate thermoplastic polymer composition is prepared by mixing a thermoplastic polymer composition with hexafluoroisopropanol, contacting the mixture in a stream with a stream of steam whereby hexafluoroisopropanol is substantially instantly evaporated and the polymer composition is obtained as microporous particulate polymer composition. The polymer composition may be a thermoplastic polymer, a mixture of thermoplastic polymers, or thermoplastic polymer containing additives such as colorant composition, lubricants, plasticizers, stabilizers, etc. The microporous particulate polymer compositions are useful in compounding with additional polymer and in forming shaped polymer articles.

3,730,919

PROCESS FOR PRODUCTION OF RIGID SELF-SKINNING POLYURETHANE FOAM

James M. McGinn, Naugatuck, Conn., assignor to Uniroyal, Inc., New York, N.Y.

No Drawing. Filed Mar. 9, 1970, Ser. No. 17,921

Int. Cl. C08g *22/44, 22/34*

U.S. Cl. 260—2.5 AZ 4 Claims

Rigid polyurethane foam with an integral solid skin is molded by a one-shot method using a formulation based on a diisocyanate [e.g., polymeric methylene bis-(phenyl-4-isocyanate)] and two polyols, one of which (e.g., propylene oxide adduct of N-aminoethyl piperazine) will react vigorously with the isocyanate, and the other of which (e.g., polypropylene oxide adduct of glycerine)

will react sluggishly with the isocyanate. A chelating agent (e.g., acetyl acetone) prevents metal ion contaminants from bringing about undesired side reactions. Blowing agent is included, as may be surfactant and catalyst. Control over the thickness of the solid skin may be exercised by varying the catalyst concentration and/or the ratio of the polyols.

3,730,920

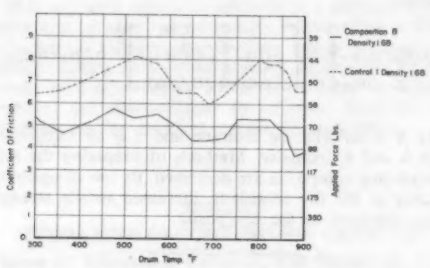
COMPOSITIONS CONTAINING MICROSPHERES AND FRICTION ELEMENTS PRODUCED THEREFROM

William J. D'Alessandro, East Brunswick, N.J., assignor to Union Carbide Corporation, New York, N.Y.

Filed Jan. 6, 1972, Ser. No. 215,764

Int. Cl. C08j *1/14*; B01j *13/02*

U.S. Cl. 260—2.5 B **13 Claims**



The disclosure of this application is directed to compositions, containing microspheres, which are especially useful in the production of friction elements, such as automotive brake linings, characterized by excellent service life and which provide excellent brake action. The friction elements of this invention are capable of withstanding severe service conditions as are frequently encountered in the braking of high speed vehicles.

3,730,921

PHOSPHORUS-CONTAINING SULFONYLHYDRAZIDES AS BLOWING AGENTS FOR RESINS

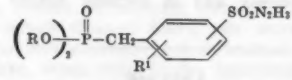
John E. Herweh, Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

No Drawing. Original application Aug. 5, 1969, Ser. No. 847,715, now Patent No. 3,658,951. Divided and this application June 14, 1971, Ser. No. 153,040

Int. Cl. C08f *47/10, 29/18*

U.S. Cl. 260—2.5 P **1 Claim**

A new class of phosphorus-containing sulfonylhydrazides of the formula:



In addition a new class of chlorosulfonated phosphorus-containing compounds useful as organic intermediates in the preparation of the hydrazides is described. The phosphorus-containing sulfonylhydrazides are useful as blowing agents for resinous blends.

3,730,922

CYCLIC ETHER POLYMERIZATION PROCESS

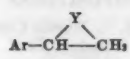
John Boor, Jr., El Cerrito, Calif., assignor to Shell Oil Company, New York, N.Y.

No Drawing. Filed Aug. 9, 1971, Ser. No. 170,392

Int. Cl. C08g *23/14*

U.S. Cl. 260—2 A **8 Claims**

Cyclic ethers are polymerized in the presence of a catalyst formed by reacting (a) at least one dialkyl compound of zinc, (b) a primary or secondary amine, (c) water and (d) at least one compound of the formula



wherein Ar is an aryl radical and Y is oxygen or sulfur. The high molecular weight products are useful, particularly in molding, coating, fiber and film fields of application.

3,730,923

POLYURETHANE FOAMS DERIVED FROM TRIS(β-HYDROXYALKYL) ISOCYANURATE-ALKYLENE OXIDE ADDUCTS

Robert L. Formaini, Millington, and Edwin D. Little, Convent Station, N.J., assignors to Allied Chemical Corporation, New York, N.Y.

No Drawing. Continuation-in-part of application Ser. No. 738,851, June 21, 1968. This application Sept. 15, 1970, Ser. No. 72,509

Int. Cl. C08g *22/14, 22/44*

U.S. Cl. 260—2.5 AQ **8 Claims**

Polyether polyols, derived from tris(β-hydroxyalkyl)-isocyanurates and alkylene oxides are reacted with organic polyisocyanates in the presence of a blowing agent and catalyst to produce urethane foams of improved properties.

3,730,924

DYE COMPOSITIONS COMPRISING A FLUOROCARBON, PIGMENT, BONDING AGENT AND DISPERSANT

Melville W. Uffner, Media, Pa., assignor to Air Products and Chemicals, Inc., Philadelphia, Pa.

No Drawing. Filed Aug. 19, 1970, Ser. No. 65,313

Int. Cl. C08f *45/66*

U.S. Cl. 260—8 **13 Claims**

A fluorine containing polymer of the monomer R_fP, where P is $—OOCCR_1=CH_2$ and R_1 is H or CH_3, and where R_f is:

$R_2(CF_2)_a(CH_2)_x—$, where R_2 is F or H, a is an integer between 1 and 20 and x is either 1 or 2;

$(CF_3)_2CR_3(CF_2)_b(CH_2)_x—$, where R_3 is F or H when b is 0, R_3 is F when b is an integer between 1 and 18 and x is either 1 or 2; or

R_4 (c—C_6F_{10})$CH_2—$, where R_4 is F or C_nF_{2n+1} and n is an integer between 1 and 4 and where c— designates an alicyclic structure,

is added to a dispersion containing a pigment, a bonding agent and a dispersing agent to obtain improved dye compositions.

3,730,925

PROCESS OF PRODUCING DEXTRIN ESTERS OF MALEIC ACID COPOLYMERS

Leslie P. Kovats, Granite City, Ill., assignor to Anheuser-Busch, Incorporated, St. Louis, Mo.

No Drawing. Filed Feb. 8, 1971, Ser. No. 113,666

Int. Cl. C08f *27/00, 27/12*

U.S. Cl. 260—17.4 ST **5 Claims**

A process is disclosed for dry reacting a starch dextrin with a maleic acid copolymer under controlled conditions to produce a dextrin ester of low degree of substitution in unswollen granule form. Specific copolymers suitable for use in this invention are a copolymer of methyl vinyl ether and maleic anhydride and a copolymer of ethylene and maleic anhydride. The dextrin has 0.5–5% moisture and the reaction is at a temperature of 100–135° C. for ½–3 hours. The amount of copolymer is 0.3–15%.

3,730,926

EPOXY RESIN ESTER BASED WATER-SOLUBLE OR WATER-DILUTABLE COATING COMPOSITIONS

Rolf Güldenpfennig, Bammental, Germany, assignor to Reichhold-Albert-Chemie Aktiengesellschaft, Hamburg, Germany

No Drawing. Continuation-in-part of application Ser. No. 861,229, Sept. 23, 1969, which is a continuation of application Ser. No. 617,813, Feb. 23, 1967, both now abandoned. This application May 17, 1971, Ser. No. 144,414

The portion of the term of the patent subsequent to Mar. 21, 1989, has been disclaimed

Int. Cl. C08g *45/00*

U.S. Cl. 260—18 EP 8 Claims

A method of preparing a water-soluble or water-dilutable synthetic resinous coating composition from compounds containing epoxide groups and/or hydroxyl groups either in the form of polyhydroxy compounds or as hydrolytic cleavage products of the epoxy compounds. The epoxy and/or hydroxy compounds are partially esterified by heating them with polycarboxylic acids produced by reacting unsaturated fatty acids with α,β-dicarboxylic acid anhydrides and subsequent hydrolysis, and the partial esters with their remaining free carboxyl groups are then neutralized by adding aqueous ammonia until the pH is between 7.8 and 9.0 and the viscosity of the obtained resin amounts to 30 to 120 sec. (German Industrial Standard 53,211).

3,730,927

POLYURETHANE ADHESIVES AND COATING COMPOSITIONS

Hans R. Schloss, Wallington, N.J., assignor to Sun Chemical Corporation, New York, N.Y.

No Drawing. Continuation-in-part of application Ser. No. 29,306, Apr. 16, 1970, now Patent No. 3,666,835, dated May 30, 1972. This application Mar. 7, 1972, Ser. No. 232,611

The portion of the term of the patent subsequent to May 30, 1989, has been disclaimed

Int. Cl. C08g *51/22, 41/04*

U.S. Cl. 260—29.2 TN 10 Claims

Adhesives and coating compositions comprise a solution of a hydroxyl-terminated urethane prepolymer and an isocyanate-terminated urethane prepolymer in water.

3,730,928

METHOD AND APPARATUS FOR CONTROLLING REACTION RATE

John M. Stone, Baton Rouge, La., assignor to Copolymer Rubber & Chemical Corporation, Baton Rouge, La.

Continuation-in-part of application Ser. No. 820,868, May 1, 1969. This application Feb. 9, 1971, Ser. No. 113,856

The portion of the term of the patent subsequent to Aug. 17, 1988, has been disclaimed

Int. Cl. C08d *1/09, 3/04, 3/06*

U.S. Cl. 260—29.7 R 7 Claims

This invention is addressed to a new and improved method and apparatus for control of reaction rate in the aqueous emulsion polymerization of monomeric material to form elastomeric polymers wherein the monomeric material is passed into an elongate passage in a spiral path in combination with a small fraction of the catalyst to effect conversion of monomeric material to form polymer particles during flow through the passage, and the temperature rise in the monomeric material is measured during flow through the passage for determination of reaction rate to thereby enable the rate of catalyst added to be controlled to provide a uniform reaction rate.

3,730,929

BLOOM INHIBITED FLAME RETARDANT COMPOSITIONS

Michael Joseph Breza, Trenton, N.J., assignor to Cities Service Company, New York, N.Y.

No Drawing. Filed Apr. 30, 1971, Ser. No. 139,256

Int. Cl. C08f *45/58*

U.S. Cl. 260—23 H 10 Claims

Compositions are disclosed which comprise a thermoplastic polyolefin polymer, an organohalide fire retarding agent, and a saturated fatty acid or metal salt of a saturated fatty acid as a bloom inhibitor. Such compositions also preferably include a metal compound synergist such as antimony oxide.

3,730,930

COMPOSITIONS FOR POWDER COATINGS CONTAINING ACRYLATE POLYMERS OR ESTERS OF FLUORINATED FATTY ACIDS AS FLOW CONTROL AGENTS

Santokh S. Labana, Dearborn Heights, Mich., assignor to Ford Motor Company, Dearborn, Mich.

No Drawing. Filed Aug. 16, 1971, Ser. No. 172,310

Int. Cl. C08g *30/12*

U.S. Cl. 260—23 EP 28 Claims

Powder coating compositions are disclosed. In general, individual powder coating compositions are a mixture of the following materials. A copolymer of glycidyl methacrylate and an ethylenically unsaturated compound is formed in such proportions as to obtain a copolymer with a glass transition temperature in the range of 40° C. to 90° C. and a molecular weight ($\overline{M}_n$) in the range of 2500 to 8500. The glycidyl methacrylate is present in the copolymer from at least about 8% by weight to no more than about 30% by weight. Another material of the coating composition is a cross linking agent containing 90 to 98% by equivalent weight of a saturated, straight chain, aliphatic, dicarboxylic acid containing 4 to 20 carbon atoms per molecule and 10 to 2% by equivalent weight of a saturated, straight chain, aliphatic, monocarboxylic acid containing 10–22 carbon atoms per molecule, the cross linking agent being present in the amount of 0.8 to 1.1 carboxylic groups for each epoxy group in the copolymer. A third material utilized in forming the powder coating mixture is a flow control agent which forms at least 0.05% by weight of the mixture. The flow control agent is a polymer having a molecular weight ($\overline{M}_n$) of at least 1000. The flow control agent also has, at the baking temperature of the powder coating composition, a lower surface tension than the surface tension of the copolymer.

3,730,931

SILICONE RESINS USED AS SURFACTANTS IN VINYL CHLORIDE FOAM

Edward T. Simoneau, Burnt Hills, Richard E. Moeller, Troy, and Norman G. Holdstock, Scotia, N.Y., assignors to General Electric Company

No Drawing. Continuation-in-part of application Ser. No. 53,973, July 10, 1970. This application Nov. 10, 1970, Ser. No. 88,472

Int. Cl. C08f *47/08, 29/24*

U.S. Cl. 260—2.5 P 17 Claims

A composition comprising a vinyl chloride polymer, a plasticizer and a silicone resin selected from a silicone

resin having $R_3SiO_{1/2}$ monofunctional units and SiO_2 tetrafunctional units with the ratio of the monofunctional units to the tetrafunctional units being from 0.25 to 0.75 with 3.0 to 5.0% by weight of hydroxyl groups and a silicone resin having $R'_3SiO_{1/2}$ monofunctional units and SiO_2 tetrafunctional units and R^2_2SiO difunctional units with the ratio of monofunctional units to tetrafunctional units to difunctional units being from 0.25–0.75 to 1 to 0.05–0.1 with 3.0 to 5.0% by weight of hydroxyl groups and wherein R, R', R^2 are monofunctional hydrocarbon radicals. The composition is mechanically frothed with air to produce a foam which is then heated to gel and fuse the foam. There is preferably used in the above composition one of the above silicone resins which has been further treated so that it has less than about 0.5% by weight of hydroxyl groups. In addition, there is provided a very efficient foaming agent which is produced by adding one of the above silicone resins with a select class of plasticizers, such as dioctyl phthalate.

3,730,932

SELF-BONDING, HEAT-CURABLE SILICONE RUBBER

George P. De Zuba, Waterford, and Abe Berger and Terry G. Selin, Schenectady, N.Y., assignors to General Electric Company

No Drawing. Filed May 17, 1971, Ser. No. 144,249

Int. Cl. C08g *51/04, 51/50*

U.S. Cl. 260—29.1 SB **16 Claims**

Self-bonding, heat-curable silicon rubber composition comprising (a) a diorganopolysiloxane polymer (b) a curing catalyst and (c) a compound of the formula,

$$R^6-\underset{\|}{C}(-Z-R^5)-\underset{\|}{C}(-Z-G^1)$$

where R_6 is selected from alkyl radicals and hydrogen, Z is selected from COO, phenylene, CO, CONH and CON—R^2, R^2 is selected from monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals, R^5 is selected from unsaturated monovalent hydrocarbon radicals and unsaturated halogenated monovalent hydrocarbon radicals, G^1 is selected from hydrogen, R^2 radicals and R^5 radicals. There may also be used in the above composition a process aid, a filler and other ingredients commonly used in heat-curable silicone rubber compositions. In place of the maleate set forth above, and/or in addition to the maleate set forth above, there may be used a silylmaleate.

3,730,933

STABLE VINYL ACETATE N-METHYLOLACRYLAMIDE LATEX WITH FULLY-HYDROLYZED POLYVINYL ALCOHOL

Peter Fallon Stehle, Media, and Jack Dickstein, Huntingdon Valley, Pa., and Samuel Loshaek, Stamford, Conn., assignors to Borden, Inc., New York, N.Y.

No Drawing. Continuation-in-part of abandoned application Ser. No. 881,580, Dec. 2, 1969. This application June 18, 1971, Ser. No. 154,642

Int. Cl. B32b *21/18;* **C08f** *37/18*

U.S. Cl. 260—29.6 WB **13 Claims**

Novel stable vinyl acetate/N-methylolacrylamide copolymer latexes containing fully-hydrolyzed polyvinyl alcohol, specially suitable in water-resistant adhesives, are prepared by a method which comprises dispersing the polyvinyl alcohol in water substantially in absence of the monomeric reactants and effecting copolymerization while adding both monomers gradually and simultaneously to the polyvinyl alcohol dispersion, the vinyl acetate and the N-methylolacrylamide being added in substantially constant ratio and at a rate substantially not exceeding the rate of their copolymerization.

3,730,934

PLASTICIZED LACTONE POLYMER COMPOSITION

Roy F. Wright, Bartlesville, Okla., assignor to Phillips Petroleum Company

No Drawing. Filed Aug. 27, 1971, Ser. No. 175,707

Int. Cl. C08f *45/36*

U.S. Cl. 260—31.6 **10 Claims**

A plasticized lactone polymer composition comprising a polyester having a molecular weight in the range of about 1,000 to about 10,000 and a polymer of a lactone and a conjugated diene.

3,730,935

PROCESS FOR THE PRODUCTION OF BONDED PARTICLES AS A MATERIAL OF CONSTRUCTION

Clifford V. Wittenwyler, Cherry Hill, N.J., assignor to Shell Oil Company, New York, N.Y.

No Drawing. Filed June 9, 1971, Ser. No. 151,531

Int. Cl. C08g *51/34*

U.S. Cl. 260—33.4 EP **14 Claims**

Foundry cores having increased pot life are prepared by (1) mixing from about 90 to 99 parts by weight of foundry sand with from 1 to 10 parts by weight of a polyepoxide binder, (2) mixing said blend with (a) a curing amount of a boron trihalide complex, especially boron trifluoride dihydrate, in an oxygenated hydrocarbon and (b) a monofunctional aromatic tertiary amine, (3) packing the blend into suitable forms and (4) allowing the polyepoxide to cure with or without heating.

3,730,936

GLASS-FIBER REINFORCED POLYURETHANE ELASTOMERS

Ernst Bugmann, Zurich, Switzerland, assignor to Unilan A.G., Chur, Switzerland

No Drawing. Continuation-in-part of application Ser. No. 719,249, Apr. 5, 1968. This application Jan. 15, 1971, Ser. No. 106,927

Int. Cl. C08g *51/10*

U.S. Cl. 260—37 N **2 Claims**

A substantially non-porous polyurethane adapted to be injection molded, extruded or similarly thermoplastically processed containing glass fibers is substantially transparent and has improved physical properties when the polyurethane is prepared by reacting an organic diisocyanate with a hydroxyl terminated polycaprolactone and a glycol, preferably, hydroquinone glycol ether.

3,730,937

ELASTOMERIC CORROSION-INHIBITING COATING AND SEALING MATERIAL

Wilburn A. Boggs, Smyrna, and Robert N. Miller, Atlanta, Ga., assignors to Lockheed Aircraft Corporation, Burbank, Calif.

No Drawing. Continuation-in-part of application Ser. No. 615,311, Feb. 13, 1967. This application Mar. 15, 1971, Ser. No. 124,461

Int. Cl. C08g *51/02;* **C09d** *5/08*

U.S. Cl. 260—37 R **6 Claims**

A protective coating and sealing material particularly adapted for fasteners, rivets and other metallic structural parts which are in intimate contact is composed of a resilient polymer containing dispersed particles of water-soluble inhibitor. The polymer when cured forms a resilient seal which prevents corrosion fluids, notably water, from entering the space between the adjacent parts, be it a fastener and adjacent hole surfaces or overlapping sheet surface. If moisture does diffuse through the polymer, some of the inhibitor is dissolved and converts the moisture to a corrosion-preventive solution. This material may also be used as a discreet layer in a coating system on a metal surface with or without a top coat, which top coat prevents excessive diffusion of moisture into the inhibited material.

3,730,938

MOISTURE-THICKENED SILICONE COMPOUNDS

Alfred H. Smith, Jr., Jonesville, and Robert A. Murphy, Burnt Hills, N.Y., assignors to General Electric Company

No Drawing. Continuation-in-part of abandoned application Ser. No. 868,887, Oct. 23, 1969. This application May 17, 1971, Ser. No. 144,222

Int. Cl. C08g *51/04*

U.S. Cl. 260—37 SB 8 Claims

Organopolysiloxane compositions containing calcium carbonate in amounts of from 5 to 200 parts for each 100 parts of the organopolysiloxane are rendered thixotropic through the addition of water and/or a humectant. Removal of this water and/or humectant will return the composition to its lower viscosity state. The thixotropic organopolysiloxane composition is useful in room temperature vulcanizing compositions, in paint formulations and in grease compositions.

3,730,939

FLAME RETARDANT POLYAMIDE COMPOSITIONS CONTAINING CERTAIN SULFANILAMIDES

Paul Joseph Koch, Mount Freedom, and Julie Ann Lapham, Denville, N.J., assignors to Allied Chemical Corporation, New York, N.Y.

No Drawing. Filed Feb. 1, 1972, Ser. No. 222,694

Int. Cl. C08g *51/60*

U.S. Cl. 260—37 N 10 Claims

Certain aromatic sulfonamide compounds impart flame retardance when blended with polyamides.

3,730,940

FLAME RETARDANT COMPOSITION

John Versnel, Plainsboro, and Joseph Green, East Brunswick, N.J., assignors to Cities Service Company, New York, N.Y.

No Drawing. Filed Oct. 1, 1971, Ser. No. 185,831

Int. Cl. C08f *45/04*

U.S. Cl. 260—41 A 9 Claims

A non-drip, self-extinguishing composition comprises polypropylene, a halogenated organic flame retardant, ammonium fluoborate or ammonium sulfate, a metal compound synergist such as antimony trioxide, and silica. The flame retardant is ordinarily a halogenated aliphatic compound, i.e., a compound having halo substituents on aliphatic or cycloaliphatic carbon atoms.

3,730,941

POLYIMIDES FROM TETRAHYDROFURAN-2,3:4,5-TETRACARBOXYLIC ACID DIANHYDRIDES

William M. Alvino, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

No Drawing. Filed Aug. 9, 1971, Ser. No. 170,274

Int. Cl. C08g *20/32*

U.S. Cl. 260—47 CP 10 Claims

Imide polymers prepared from tetrahydrofuran-2,3:4,5-tetracarboxylic dianhydride and diamine, preferably aromatic diamine and most desirably 4,4'-diaminodiphenyl ether.

3,730,942

SELF-EXTINGUISHING COMPOSITION

Joseph Green, East Brunswick, and John Versnel, Plainsboro, N.J., assignors to Cities Service Company, New York, N.Y.

No Drawing. Filed Oct. 8, 1971, Ser. No. 187,896

Int. Cl. C08f *45/04*

U.S. Cl. 260—41 A 9 Claims

A non-drip, self-extinguishing composition comprises polyethylene, a halogenated organic flame retardant, ammonium fluoborate or ammonium sulfate, a metal compound synergist such as antimony trioxide, and silica.

3,730,943

STABILIZED VINYL CHLORIDE POLYMERS

Lewis B. Weisfeld, Highland Park, and Carl W. Pause, Spotswood, N.J., assignors to Cincinnati Milacron Chemicals, Inc., Reading, Ohio

No Drawing. Continuation-in-part of application Ser. No. 485,094, Sept. 3, 1965, now Patent No. 3,567,681, dated Mar. 2, 1971. This application Dec. 16, 1970, Ser. No. 98,847

Int. Cl. C08f *45/62*

U.S. Cl. 260—45.75 R 9 Claims

Halogen containing resin food packaging materials are effectively stabilized with mixtures of calcium neodecanoate and zinc neodecanoate.

3,730,944

PROCESS FOR THE PREPARATION OF POLYPHENYLENE ETHERS WITH PROMOTED COPPER-AMINE CATALYSTS

James G. Bennett, Menands, and Arthur Katchman, Delmar, N.Y., assignors to General Electric Company

No Drawing. Filed Apr. 30, 1971, Ser. No. 139,216

Int. Cl. C08g *23/18*

U.S. Cl. 260—47 ET 16 Claims

There is disclosed an improved process for the preparation of high molecular weight polyphenylene ethers by oxidatively coupling a di-ortho-substituted phenolic precursor in a reaction system containing oxygen and a complex catalyst formed from a copper salt and either a primary, secondary or tertiary amine and an alkylene carbonate or a dialkyl sulfoxide promotor or a primary or tertiary amine and a dialkyl formamide promotor. Use of the promotors results in the formation of higher molecular weight polymer in a given reaction time or polymer of comparable molecular weight in substantially decreased reaction time.

3,730,945

COMPOSITIONS OF EPOXY RESINS AND THE REACTION PRODUCTS OF MULTIAZIRIDINO COMPOUNDS AND HYDROGEN SULFIDE

Heinz Uelzmann, Cuyahoga Falls, and David C. Hidinger, Jr., Akron, Ohio, assignors to The General Tire & Rubber Company

No Drawing. Application Nov. 3, 1969, Ser. No. 873,683, which is a division of application Ser. No. 637,352, May 10, 1967, now Patent No. 3,514,369. Divided and this application Jan. 14, 1972, Ser. No. 217,970

Int. Cl. C08f *30/14*

U.S. Cl. 260—47 EN 10 Claims

Novel adducts of multiaziridino compounds are prepared by reacting H_2S with multiaziridino compounds. The reaction products, which contain secondary amino and thio groups, may be used to form adhesives, particularly with epoxy compounds, and metal-to-metal laminates.

3,730,946

PROCESS FOR MAKING CYANOARYLOXY POLYMERS AND PRODUCTS DERIVED THEREFROM

Darrell R. Heath and Joseph G. Wirth, Schenectady, N.Y., assignors to General Electric Company

No Drawing. Filed Jan. 20, 1971, Ser. No. 108,152

Int. Cl. C08g *25/00*

U.S. Cl. 260—47 R 19 Claims

Cyanoaryloxy polymers are prepared from the reaction of a dinitrobenzene containing a cyano group directly attached to the benzene nucleus with an alkali-metal salt of a divalent carbocyclic aromatic radical in the presence of a dipolar aprotic solvent.

3,730,947

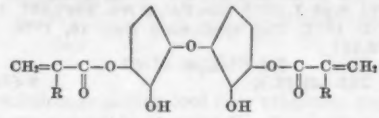
CERTAIN LOW VISCOSITY THERMOSETTING ACRYLIC RESINS AND THEIR USE AS BINDERS IN DENTAL FILLING COMPOSITIONS

Donald G. Stoffey, Hacienda Heights, and Henry L. Lee, Jr., San Marino, Calif., assignors to Lee Pharmaceuticals, South El Monte, Calif.

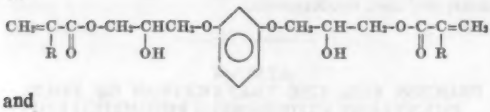
No Drawing. Filed Dec. 28, 1970, Ser. No. 102,043
Int. Cl. C07c *69/54*; C08f *33/00*
U.S. Cl. 260—47 UA 6 Claims

The compounds of the formulae:

(a)

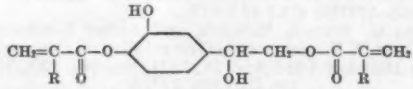


(b)



and

(c)



wherein R is hydrogen, lower alkyl, or halogen, are utilized as thermosetting binders for dental restorative compositions. The compounds are prepared by the reaction of the appropriate diepoxide with acrylic acid and derivatives thereof.

3,730,948

HEAT RESISTIVE RESIN COMPOSITIONS COMPRISING AN EPOXY, ORGANIC ACID ANHYDRIDE, AND MALEIMIDE

Keiiti Akiyama and Kiyoji Makino, Yokosuka, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan

No Drawing. Filed Mar. 22, 1971, Ser. No. 127,004
Claims priority, application Japan, May 13, 1970, 45/40,128
Int. Cl. C08g *30/14*
U.S. Cl. 260—47 EC 4 Claims

Solventless composition used for heat resistive resin which is prepared by dissolving mutually a specific maleimide compound, a specific epoxy compound and a specific organic acid anhydride.

The mixing weight ratio of said maleimide compound, epoxy compound, and acid anhydride is respectively from 30 to 80%, from 10 to 35%, and from 10 to 35% on the basis of total mixture.

Heat resistive resin can be obtained by curing said composition at a temperature of from 100 to 200° C. for about from 10 to 100 minutes.

3,730,949

THERMOSTABLE AND THERMOPLASTIC LINEAR POLYTHIOETHERS

Camille Jungblut, 1 Tour Aquitaine, 92 Courbevoie, France

No Drawing. Continuation-in-part of application Ser. No. 22,048, Mar. 23, 1970. This application Oct. 1, 1971, Ser. No. 185,825
Int. Cl. C08g *33/10*
U.S. Cl. 260—47 R 6 Claims

Linear thermoplastics, having exceptional thermal stability and weather resistance, of the general formula

$$\{S—R—S—R'\}$$

in which R is a bifunctional aromatic radical and R' is an aromatic-like 6-membered ring compound containing 2 nitrogen heteroatoms and 3 conjugated double bonds in the ring, selected from the group consisting of pyridazine, phthalazine, pyrazine, and pyrimidine, and the process for producing these polymers by the polycondensation of a salt of an aromatic dithiol with the dihalogenated derivative of pyridazine, phthalazine, pyrazine or pyrimidine under specified conditions are disclosed.

3,730,950

POLYURETHANE COPOLYMERS DERIVED FROM THE CARBORANE-SILICON PHTHALOCYANINE MONOMER

Robert L. Barnes, Clifton, N.J., William M. Block, Staten Island, N.Y., and Daniel Grafstein, Morristown, N.J., assignors to The Singer Company, New York, N.Y.

No Drawing. Application Dec. 15, 1969, Ser. No. 885,335, which is a continuation-in-part of abandoned application Ser. No. 619,199, Feb. 28, 1967. Divided and this application Feb. 1, 1972, Ser. No. 222,706
Int. Cl. C08g *22/00, 22/08*
U.S. Cl. 260—77.5 AQ 1 Claim

Polyurethane copolymers derived from the carboranesilicon phthalocyanine monomer which are useful as high temperature stable coating, adhesives, molding compounds for electronic components and laminating resins are described.

3,730,951

POLYENES MODIFIED WITH POLYFUNCTIONAL N-HALO AMINES

George L. Braude, Ellicott City, Md., assignor to W. R. Grace & Co., New York, N.Y.

No Drawing. Filed Dec. 22, 1971, Ser. No. 211,094
Int. Cl. C08g *22/04*
U.S. Cl. 260—77.5 B 26 Claims

Modified polymers are prepared by reacting liquid or solid polyenes containing at least two reactive carbon to carbon unsaturated groups per molecule with polyfunctional N-halo amines, particualrly N-halo polycarbamates under ambient conditions in the presence of free radical generators such as UV irradiation. The resulting modified polymers range from solvent soluble chain extended polymers to solid cured, i.e. cross-linked stable and solvent resistant polymeric materials. The modified polymers may be used as coatings, films, sealants, molded products, wet strength resins, textile treating agents, bleaching agents, flame retardants and the like.

3,730,952

AMIDE OXADIAZOLE POLYMERS AND POLYMER PRECURSORS

Billy M. Culbertson, Burnsville, Minn., assignor to Ashland Oil, Inc., Ashland, Ky.

No Drawing. Application Sept. 20, 1968, Ser. No. 761,306, which is a continuation-in-part of application Ser. No. 502,322, Oct. 22, 1965. Divided and this application July 23, 1970, Ser. No. 63,988
Int. Cl. C08g *20/04*
U.S. Cl. 260—78 A 5 Claims

Thermally stable fibers and films have been prepared by reaction of equimolar quantities of an amino aroyl hydrazide and an acid dichloride. The polymers can be converted to the corresponding amide-oxadiazole polymers by dehydration.

3,730,953

PROCESS FOR PRODUCING HIGH MOLECULAR POLYURETHANES BY REACTING OXADIAZINONES WITH POLYOLS IN THE PRESENCE OF AN ORGANOTIN CATALYST

Kenji Naito, and Kiyoshi Yasuda, both of Osaka, Japan, assignors to Takeda Chemical Industries Ltd., Osaka, Japan

Filed Dec. 7, 1971, Ser. No. 205,714
Claims priority, application Japan, Dec. 28, 1970, 45/124073
Int. Cl. C08g *22/42*
U.S. Cl. 280—77.5 AM 21 Claims

A process for producing high molecular polyurethane compounds having wide uses as coating materials, resins and

foams. The high molecular compounds are produced by reacting an oxadiazinone compound, which has been obtained by the reaction of an organic isocyanate compound with carbon dioxide, with a polyol compound in the presence of a catalyst of such a specific organotin compound as tetrabutyl-1,3-diacetoxydistannoxane.

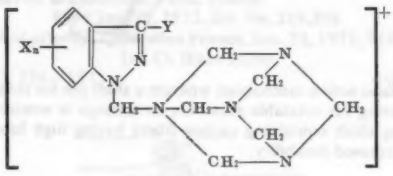
3,730,954

N-(SUBSTITUTED INDAZOLYL-N^1-METHYL)HEXAMETHYLENETETRAAMMONIUM HALIDES

Pasquale Paul Minieri, Woodside, N.Y., assignor to Tenneco Chemicals, Inc.

Filed Nov. 22, 1971, Ser. No. 201,178
Int. Cl. C07d *55/52*
U.S. Cl. 260—248.5 **10 Claims**

Compounds that have the structural formula



wherein X represents halogen, nitro, amino, acetamino, or (halobenzylidene)amino; Y represents hydrogen or halogen; Z represents halogen; and n represents an integer in the range of zero to 2 are used to control the growth of bacteria, fungi, and other microorganisms. Illustrative of these compounds is N-(6-nitroindazolyl-N^1-methyl)hexamethylenetetraammonium chloride.

3,730,955

DIANTHRAPYRIMIDINE YELLOW

Edward E. Jaffe, Union, N.J., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 10, 1971, Ser. No. 179,591
Int. Cl. C07d *51/48*
U.S. Cl. 260—256.4 Q **1 Claim**

Dianthrapyrimidine, a yellow pigment suitable for use in finishes, especially automotive finishes.

3,730,956

4 ADAMANTYLAMINO QUINOLINES

Koert Gerzon, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianopolis, Ind.

Filed Nov. 26, 1971, Ser. No. 202,571
Int. Cl. C07d *33/52*
U.S. Cl. 260—286 R **9 Claims**

A group of novel 4-(adamantylamino)quinoline compounds which are useful as algaecides and protozoacides. Some are useful as anti malarias.

3,730,957

PROCESS FOR COUPLING LOWER OLEFINS

John E. Bozik, Plum Borough, Pa.; John A. Ondrey, Tyler, Tex., and Harold E. Swift, Gibsonia, Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 660,901, Aug. 16, 1967, abandoned, which is a continuation-in-part of Ser. No. 588,311, Oct. 21, 1966, abandoned. This application Dec. 14, 1970, Ser. No. 98,018
Int. Cl. C07c *3/20, 11/12*
U.S. Cl. 260—673 **15 Claims**

Propylene, isobutylene and related olefins are coupled at elevated temperatures in the presence of oxygen and a catalyst comprising bismuth together with another metal in a binary metal oxide compound to produce higher molecular weight olefinic and aromatic compounds.

3,730,958

SKELETAL ISOMERIZATION OF OLEFINS OVER HALOGEN-CONTAINING ZIRCONIA CATALYST

John W. Myers, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 30,278, April 20, 1970, Pat. No. 3,663,453. This application Feb. 22, 1972, Ser. No. 228,321
Int. Cl. C07c *5/22, 5/24*
U.S. Cl. 260—683.2 **8 Claims**

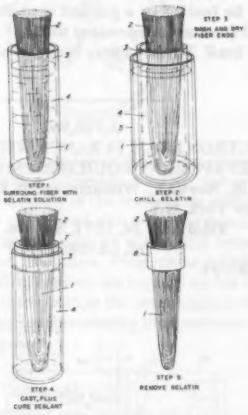
Olefins undergo skeletal isomerization by contact with a catalyst containing a zirconium compound and a halogen.

3,730,959

FABRICATION OF HIGH PRESSURE SEALS FOR WATER EQUILIBRATED FIBER BUNDLES

Charles Russell Horres, Jr., Chapel Hill, and Richard L. Leonard, Raleigh, both of N.C., assignors to The United States of America as represented by the Secretary of the Interior

Filed July 8, 1971, Ser. No. 160,668
Int. Cl. B29d *3/02, 27/00*
U.S. Cl. 264—263 **12 Claims**



The formation of high pressure seals for water equilibrated, hollow fiber membranes is effected by injecting a solution of gelatin around the active membrane area, chilling the solution to solidify the gelatin and immobilize the water, washing the ends or inactive area of the membrane with warm water, drying the ends, and casting a seal on the solidified gelatin surface. The gelatin is removed by heating and washing the fibers.

3,730,960

NOVEL FIRST AID PRODUCTS

Ling Wei, Watchung, and Robert Marchisotto, East Brunswick, both of N.J., assignors to Plough Inc., Memphis, Tenn.

Division of Ser. No. 887,355, Dec. 22, 1969, Pat. No. 3,624,224. This application June 25, 1971, Ser. No. 165,857
Int. Cl. A61k *15/00*
U.S. Cl. 424—78 **6 Claims**

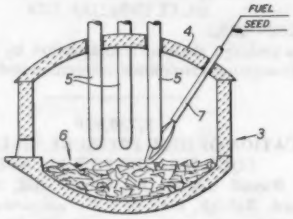
Disclosed herein are novel antiseptic compositions comprising an aqueous solution of a quaternary ammonium compound, a local anesthetic and a polyoxyethylene-polyoxypropylene block polymer. They are most advantageously supplied as impregnants of a hermetically sealed pad.

ELECTRICAL

3,730,961
ARC IGNITION BY SEEDED GAS

Laurence Miller Bryce, Fife, Scotland, assignor to British Steel Corporation, London, England

Filed Jan. 4, 1972, Ser. No. 215,310
Claims priority, application Great Britain, Jan. 22, 1971, 2,970/71
Int. Cl. H05b *7/00*
U.S. Cl. 13—9 **14 Claims**

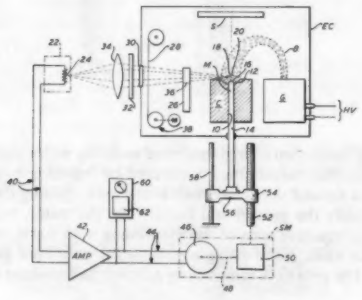


A method of igniting an arc furnace in which a hot fluid is introduced into the space between an electrode and the charge, the fluid being seeded with a compound which is ionized at the subsisting temperature whereby to promote breakdown of, and initiate an arc across, the said space. The fluid may be fuel oil or a gas and is preferably aflame; it may be applied from an independent torch or it may issue from the electrode itself. The seed may be a salt of potassium or caesium.

3,730,962
ELECTRON BEAM FURANCE WITH MATERIAL-EVAPORANT EQUILIBRIUM CONTROL

Marshall H. Norwalk, Williamsville, N.Y., assignor to Airco, Inc., New York, N.Y.

Filed Aug. 24, 1971, Ser. No. 174,385
Int. Cl. H05b *7/00*
U.S. Cl. 13—31 **13 Claims**

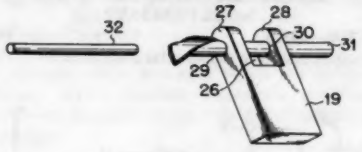


A vacuum coating device having an evaporation chamber and a rod fed electron beam gun, wherein the end (target) of a consumable rod is melted and vaporized by the electron beam; the meniscus of the melt being kept by automatic control at a constant height and in equilibrium with the evaporation rate of the rod material; the control comprising an electric servo motor for advancing the rod at a controlled rate into the evaporation chamber, a photocell subject to radiation from the rod melt, a fixed mask with a graduated aperture for varying the sensed radiation according to varying height of the meniscus, and a control amplifier responsive to the photocell for supplying a rate control voltage to the servo motor.

3,730,963
CONSTRUCTION FOR SUPPORTING THE ROTATABLE MEMBERS OF A PIANO ACTION MECHANISM EMPLOYING CARBON FIBER MIXED BUSHING CLOTH

Katsuhiko Imagawa, Hamakita, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamatsushi, Shizuoka-ken, Japan

Filed Dec. 27, 1971, Ser. No. 212,017
Claims priority, application Japan, Dec. 30, 1970, 45/133764
Int. Cl. G10c *3/18*
U.S. Cl. 84—251 **3 Claims**

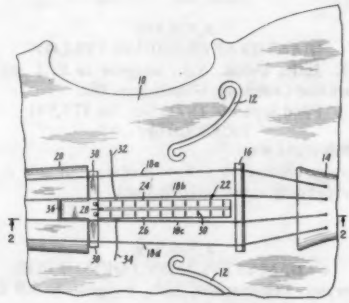


A piano action mechanism wherein a shaft pin for rotatably supporting the rotatable members on a flange is wound with bushing cloth containing carbon fibers having high lubricity and increased durability.

3,730,964
METHOD AND APPARATUS FOR INSTRUCTION OF STRINGED INSTRUMENT BOW POSITIONING

Burton Kaplan, 817 West End Ave., New York, N.Y.

Filed Nov. 24, 1971, Ser. No. 201,844
Int. Cl. G09b *15/06*
U.S. Cl. 84—470 **9 Claims**



A bow position sensor is secured to a stringed instrument and an indicator responsive to the sensor provides indication to the student of each departure of the bow from desired positioning during play.

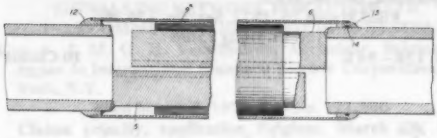
3,730,965
EXPANSION JOINT FOR GAS-INSULATED TRANSMISSION LINE

James Christofferson, West Newbury, Mass., assignor to High Voltage Power Corporation, Westboro, Mass.

Filed July 14, 1972, Ser. No. 272,083
Int. Cl. H02g *15/24*
U.S. Cl. 174—13 **4 Claims**

An expansion joint for the central conductor of a compressed-gas-insulated transmission line permits the desired mutual longitudinal movement of adjacent central conductors by means of flexible connectors so arranged as to provide a negligible increase of diameter of the central conductive path

while having sufficient length and flexing properties such that fatigue is reduced. The flexible connectors are a multiplicity



of thin strips disposed in a circular path within a thin surface transverse to the axis of the transmission line.

3,730,966

CRYOGENIC CABLE

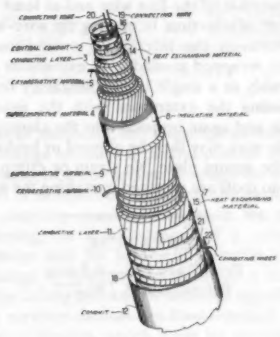
Marcel Aupoix, Paris, and Francois Moisson-Franckhauser, Bretiany-sur-Orge, both of France, assignors to Compagnie Generale D'Electricite, Paris, France

Filed Jan. 20, 1972, Ser. No. 219,398

Claims priority, application France, Jan. 21, 1971, 7102012

Int. Cl. H01v *11/00*

U.S. Cl. 174—15 C **6 Claims**



Cryogenic cable of great length consisting of two co-axial structures, each comprising, a cryogenic fluid transport tubing, a first layer of conductive material surrounding the tubing, a second layer of superconductive material surrounding the first layer and separated from it by a ring having high resistivity, this ring enabling the flow of the cryogenic liquid between the layers and preventing any thermal disturbances by magnetic interaction between layers. The layers of conductors or superconductors and the ring are wound helically.

3,730,967

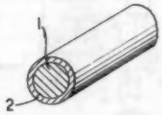
CRYOGENIC SYSTEM INCLUDING HYBRID SUPERCONDUCTORS

James Nicol, Dover, Mass., assignor to Air Reduction Company, Incorporated, New York, N.Y.

Filed May 13, 1970, Ser. No. 36,739

Int. Cl. H01b *7/34, 5/10*

U.S. Cl. 174—15 C **23 Claims**



One or more superconducting strands are separated from a matrix of normally conducting material by a high resistance barrier layer of german silver. This may take the form of a cylindrical shell of german silver, either partly or completely enclosing a core comprising one or more strands of superconducting material, or a composite of superconducting and normally conducting strands. The barrier may comprise a german silver layer sandwiched between a pair of layers of normally conducting material, such as copper. An alternative embodiment comprises a matrix of copper or other low resistance metal in which are embedded superconducting strands in a substantially parallel array separated by laminae of german silver. After correduction, and twisting, superconductor wires, or composites, formed to include german silver barrier layers, may be used as superconducting coils in cryogenic systems.

3,730,968

TUBULAR ENCLOSED 3-PHASE HIGH VOLTAGE LINE

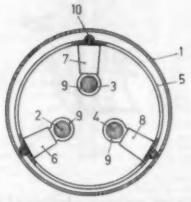
Hermann Paul Szente-Varga, Nussbaumen, Switzerland, assignor to Aktiengesellschaft Brown, Boveri & Cie, Baden, Switzerland

Filed Nov. 2, 1971, Ser. No. 194,839

Claims priority, application Switzerland, Dec. 3, 1970, 17930/70

Int. Cl. H01b *9/06*

U.S. Cl. 174—27 **3 Claims**



A three-phase high voltage line in which the phase conductors are located within a grounded tubular, gas-pressurized casing. To facilitate assembly of the conductors within the casing, supporting rings are spaced along and surround the conductors, and the latter are secured within and connected to the ring by means of insulators. Projections which provide either a sliding or rolling contact are located on the outer surface of the rings and these engage the inner surface of the casing and serve as guides for introducing the conductor and ring assemblies into the casing.

3,730,969

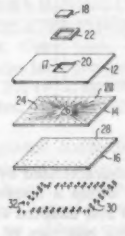
ELECTRONIC DEVICE PACKAGE

Robert Leroy Buttle, Summit, and William Douglas Bailey, Somerville, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed March 6, 1972, Ser. No. 232,038

Int. Cl. H01l *5/00*

U.S. Cl. 174—52 S **10 Claims**



An electronic device package comprises a ceramic top card having an opening therethrough and at least one other card including a ceramic pattern card on which an electronic device is mountable having a film pattern of electrical leads on an

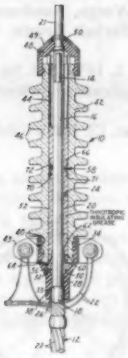
upper surface thereof. The pattern card is laminated to the top card and has a plurality of holes therethrough. Each hole communicates with an electrical lead and is interiorly plated with an electrically conductive film. A pin is brazed to the conductive film in each hole and to a corresponding electrical lead.

3,730,970

TERMINAL WITH GREASE RETAINING MEMBERS

Leonard A. Johnson, Woodbury, Minn., assignor to Minnesota Mining & Manufacturing Company, St. Paul, Minn.

Filed Oct. 4, 1971, Ser. No. 185,990
Int. Cl. H02g *15/02*
U.S. Cl. 174—73 R **8 Claims**



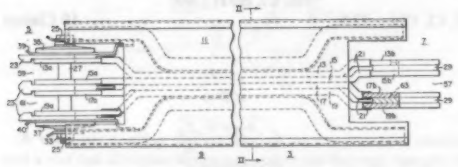
A terminal for high voltage electrical cable formed with a chamber extending through the terminal from an inlet end for engagement over the cable to an outlet end, and having a viscous insulating grease filling a portion of the chamber from the inlet end. The terminal includes means operable upon insertion of the cable into the inlet end of the chamber for retaining the grease in the chamber about the cable for a predetermined distance from the inlet end.

3,730,971

BUS DUCT CONVERTIBLE FROM A.C. USE TO D.C. USE

Daniel R. Durham, Beaver Falls, and William W. Hamilton, Beaver, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed April 28, 1971, Ser. No. 248,475
Int. Cl. H02g *5/06*; **H01r** *29/00*
U.S. Cl. 174—68 B **9 Claims**



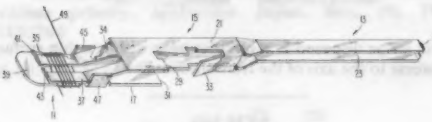
A bus duct section characterized by four bus bars insulated from each other and within a housing the end portions of which are uninsulated and adapted for overlapping connection with corresponding bus bars of other similar sections, each outer pair of bus bars having conducting spacers between the end portions thereof, whereby the bus duct may be converted from a three-phase four wire alternating-current unit to a two pole direct current bus duct.

3,730,972

WIRE-WRAP TERMINAL AND A METHOD OF MAKING A WIRE-WRAP CONNECTION

William M. Hennessey, Somerville, N.J., assignor to Burroughs Corporation, Detroit, Mich.

Filed March 20, 1972, Ser. No. 236,306
Int. Cl. H02g *15/08*
U.S. Cl. 174—94 R **10 Claims**



A wire-wrap terminal for a terminal pin for use with fine wire, in computer circuitry for example, is provided utilizing a pair of flat, juxtaposed, conductive extensions on one end of the pin to form a clamping interface. The extensions may be fabricated of the same electrically conductive metal sheet as the terminal pin with one of the extensions having portions cut away to form resilient prongs interfaced against a datum plate, being the other extension. The outer end of one of the extensions, such as the resilient prongs, is slightly bent outwardly for ease of insertion of the fine wire and at least one shoulder limits the depth of insertion. In making the wire-wrap, the wire is inserted between the interfacing extensions against the shoulder limit, wrapped around both extensions a plurality of times, preferably in a single layer, outwardly from the limit, thus constraining the extensions with the inserted portion therebetween, and again inserted into the clamping interface. The end of the wire may then be clipped or broken off against the edge of the datum plate. No strain or crimp is placed on the wire and no tools are required in making the wire-wrap.

ERRATUM

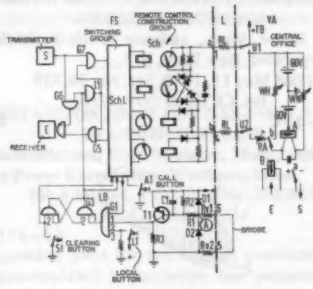
For Class 178—6.8 see:
Patent No. 3,730,277

3,730,973

TELEPRINTER SUBSCRIBER SET HAVING A REMOTE SWITCHING GROUP FOR GALVANIC DECOUPLING FROM THE CONNECTING LINE AND A CIRCUIT ARRANGEMENT FOR ENABLING LOCAL OPERATION

Roman Lutz, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed June 11, 1971, Ser. No. 152,053
Claims priority, application Germany, Aug. 12, 1970, P 20 40 161.0
Int. Cl. H04l *13/00*
U.S. Cl. 178—2 R **3 Claims**



A Telex subscriber set includes a plug control circuit for preventing destruction of the electronic input relays of a

remote control switching group due to inadvertent short circuits arising in manipulation of the connecting plug.

3,730,974

SIGNALLING NETWORK FOR AUTOMATIC TELECOMMUNICATION SWITCHING SYSTEM

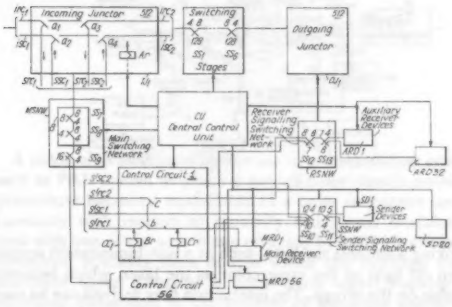
Guy A. J. M. G. H. Verschueren, Aartselaar, Belgium, assignor to International Standard Electric Corporation, New York, N.Y.

Filed March 5, 1971, Ser. No. 121,260

Claims priority, application Belgium, March 20, 1970, 7003952

Int. Cl. H04l *11/00*

U.S. Cl. 178—3 **6 Claims**



Disclosed is an automatic toll telegraph switching system in which an exchange includes a central control unit to control the establishment of a connection through the system. In the forwarding of a connection to a remote exchange, sender devices and auxiliary receiver devices in the exchange are used only during the establishment of a connection to a remote exchange and for sufficient duration to enable the remote exchange to receive and approve a class of traffic signal from the calling line and verification signals. The sender and auxiliary receiver devices are then released. This way the number of such devices which must be provided is significantly reduced.

3,730,975

PICTURE AND WRITING RECORDER USING BALL-PEN SYSTEM

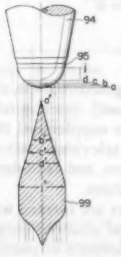
Yoshinori Kono; Norio Iwasaki; Tosho Sato; Masaya Mizuno, and Jikko Takeuchi, all of Tokyo, Japan, assignors to Fuji Telecasting Company Ltd., Tokyo, Japan

Filed March 10, 1971, Ser. No. 122,659

Claims priority, application Japan, April 4, 1970, 45/28273

Int. Cl. H04n *1/24, 1/46*

U.S. Cl. 178—5.2 R **5 Claims**



The present invention is used to make an excellent recording of color pictures and writings by a simple unit and easy operation wherein each set of ball-pen system recording part is provided for each restored primary color signal at receiving part for a color recording apparatus which is composed of transmitting and receiving parts, and a ball-pen is held pressed on a recording paper with some pressure corresponding to the strength of said primary color signal related. The present invention is able to apply to a facsimile.

3,730,976

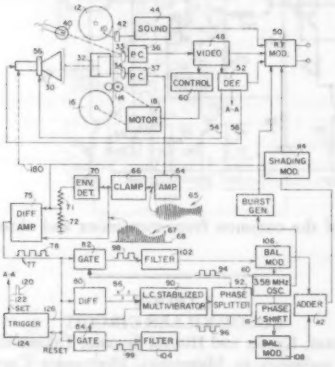
COLOR SIGNAL RECORDING AND DECODING

Norman W. Parker, Wheaton, Ill., assignor to Motorola, Inc., Franklin Park, Ill.

Continuation of Ser. No. 8,947, Feb. 5, 1970, abandoned. This application Dec. 20, 1971, Ser. No. 210,098

Int. Cl. H04n *5/86, 9/02*

U.S. Cl. 178—5.4 CD **16 Claims**



Color signal recording in which recorded pulses have widths and positions to represent color saturation and hue. For example, pulses of variable width are recorded, with alternate pulses representing one hue while interspersed pulses represent another hue. The system may use a flying spot scanner operating on a brightness image representation and on the color signal information to generate complete image representative signals. Circuitry is disclosed for minimizing error in deriving signals from the recording, which may be in the form of photographic film, for example, and also reducing error in the synchronization of the scanning operation. Display of the image representative signals may be through known television techniques.

3,730,977

COLOR CAMERA HAVING CAPACITANCE COMPENSATED INDEX STRIPS

Arthur Bertel Larsen, Colts Neck, N.J., assignor to Bell Telephone Laboratories Incorporated, Murray Hill, N.J.

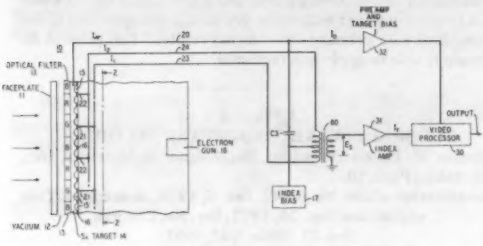
Filed Feb. 29, 1972, Ser. No. 230,344

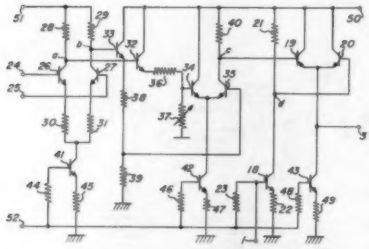
Int. Cl. H04n *9/06*

U.S. Cl. 178—5.4 ST **12 Claims**

Two sets of interdigitated conductive indexing strips are placed on the cathode side of a camera tube target onto which the scene is focused in color stripe sets. The conducting strips are dc biased to intercept part of the scanning electron beam and thereby provide an output current which serves to reference the beam position. The video target lead and one lead from each of the interdigitated indexing strip sets are connected respectively to the center tap and ends of a transformer primary. This interconnection acts to neutralize the capacitive

coupling between the conductive strips and the target, which may be a high conductivity silicon target, thereby preventing





coupling of the common frequency index and chrominance signals.

3,730,978

COLOR KILLER CIRCUIT

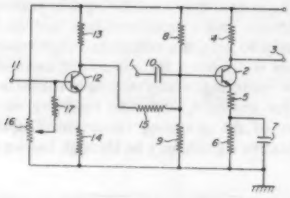
Shuzo Wakai, Kyoto, and Hitoshi Sugano, Takatsuki, both of Japan, assignors to Matsushita Electronics Corporation, Osaka, Japan

Filed March 22, 1972, Ser. No. 236,917

Claims priority, application Japan, March 30, 1971, 46/19359

Int. Cl. H04n 9/48

U.S. Cl. 178—5.4 CK **1 Claim**



A color killer circuit in which means are provided so as to carry out a stable color killing operation free from fluctuations in power supply voltage so that the color killing operation may not be directly affected by the absolute value of the color killer control voltage.

3,730,979

METHOD AND MEANS FOR PARTICLE AND LIGHT WAVE INTERACTION

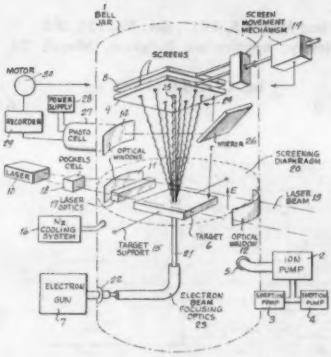
Helmut J. Schwarz, 49 Carver Circle, Simsbury, Conn., and Heinrich W. Hora, Rotdornweg 4, 8012 Ottobrunn Bie Munich, Germany

Filed Dec. 7, 1970, Ser. No. 95,777

Int. Cl. H04n 9/22

U.S. Cl. 178—5.4 R **25 Claims**

Method and means for creating an interaction between a beam of particles and electromagnetic waves, particularly at optical frequencies, wherein a high velocity beam of particles, such as electrons, is passed through a suitable interaction zone, for example, in the form of an optically transparent dielectric target, such as a thin crystalline film, while the target is irradiated with laser light polarized generally in the direction of travel of the particles, whereby the particles upon



striking a suitable medium, such as a non-luminescent screen, give off light of the same color as the laser, which becomes visible on the screen. The interaction thus derived can be used in many particular applications such as, for example, in a color television tube and other electronic display or information storage devices.

3,730,980

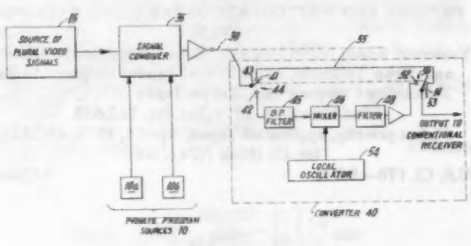
ELECTRONIC COMMUNICATION APPARATUS FOR SELECTIVELY DISTRIBUTING SUPPLEMENTARY PRIVATE PROGRAMMING

Donald Kirk, Jr., St. Petersburg, Fla., assignor to Television Communications Corporation, New York, N.Y.

Filed May 24, 1971, Ser. No. 146,086

Int. Cl. H04n 1/44

U.S. Cl. 178—5.1 **4 Claims**



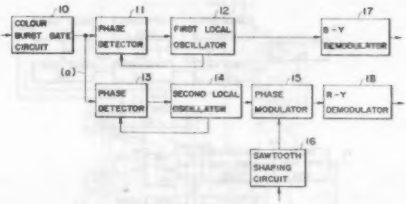
Private programming information, e.g., television programs provided for a community antenna television signal distribution system (CATV) to supplement those programs received from local commercial television stations, are propagated over a common cable medium, and are selectively recoverable only by participating subscribers.

Two private programs are formed with inverted modulation spectra in the mid-band channel frequency spacing. One or both programs are recovered at participating subscriber stations by heterodyne converters which re-invert the encripted signals, shifting one or both signal spectra to otherwise unoccupied commercial channels for recovery by a conventional television receiver.

3,730,981
COLOR TELEVISION RECEIVER

Yasumasa Sugihara, and Akira Horaguchi, both of c/o The General Corporation, 1116 Suenaga, Kawasaki-shi, Kanagawa-ken, Japan

Filed June 1, 1971, Ser. No. 148,724
Claims priority, application Japan, Jan. 29, 1971, 46/3387; March 2, 1971, 46/11178
Int. Cl. H04n *9/44*
U.S. Cl. 178—5.4 P **7 Claims**

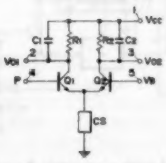


A color television receiver for use in a transmission system such as PAL system in which a pair of color signals provides quadrature balanced modulation of a color subcarrier simultaneously with respect to mutually orthogonal modulation axes with one of the axes being reversed by 180° for alternate horizontal scanning lines and in which the resulting color television signal contains a color burst signal capable of providing distinction of the polarity of the color subcarrier that is phase alternating, the receiver using two reference subcarriers indicating the demodulation axes during demodulation of the chrominance signal, one of said reference subcarriers reverting its phase in consecutive horizontal scanning lines by 180° in correspondence to the respective modulation axis, characterized in that for generating the reference subcarrier having an alternating phase a subcarrier of a frequency of $fsc \pm (2n-1)/2\ fH$ is generated, where fsc denotes the color subcarrier frequency, fH the horizontal scanning frequency and n a positive integer, and this subcarrier is so modulated in a phase modulating means with a sawtooth wave of horizontal scanning frequency that its phase during each line keeps constant relative to the other reference subcarrier.

3,730,982
BURST LEVEL DETECTORS AND PHASE DETECTORS UTILIZING THE SAME

Masayasu Niimi, Kodaira-shi, Tokyo, and Katsuo Mouri, Totsuka-ku, Yokohama-shi, Kanagawa-ken, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 27, 1971, Ser. No. 212,183
Claims priority, application Japan, Dec. 28, 1970, 45/120454; April 16, 1971, 46/23865
Int. Cl. H04n *9/48*
U.S. Cl. 178—5.4 CK **18 Claims**

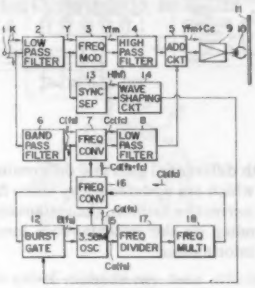


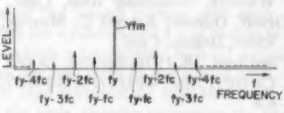
A burst level detector for use in a color television receiver comprises a balanced type differential amplifier stage including a pair of transistors, a pair of load resistors respectively connected to the transistors, means to impress a burst signal voltage upon the input terminal of the differential amplifier stage and means to derive an output signal from the differential amplifier, characterized in that the load resistors have different resistance values to establish a point at which the polarity of the differential output from the differential amplifier stage reverses. The burst level detector can be converted into a phase detector by connecting a series circuit including a resistor and a capacitor across the load resistors.

3,730,983
RECORDING AND REPORDUCING SYSTEM FOR COLOR VIDEO SIGNAL

Toshihiko Numakura, Tokyo, and Morio Yoshimatsu, Kanagawaken, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 15, 1970, Ser. No. 37,696
Claims priority, application Japan, Jan. 26, 1970, 45/6856
Int. Cl. H04n *9/38, 5/78*
U.S. Cl. 178—5.4 CD **4 Claims**





A composite color video signal may be magnetically recorded by separating the luminance and chrominance signals, and frequency modulating the former on a carrier, and frequency shifting the latter such that the bands of the frequency-modulated luminance signal and the frequency-converted chrominance signal are substantially not overlapping. The two signals are then combined and magnetically recorded with the frequency-converted chrominance signal added to the frequency-modulated luminance signal. To avoid a beat interference between the second harmonic of the carrier of the frequency-converted chrominance signal and the luminance signal, the system is designed to interleave the second harmonic of the carrier of the frequency-converted chrominance signal with the luminance signal. By avoiding the beat interference the amplitude of the frequency-converted chrominance signal relative to the amplitude of the frequency-modulated luminance signal can be made large with resulting good signal-to-noise ratio of the chrominance signal.

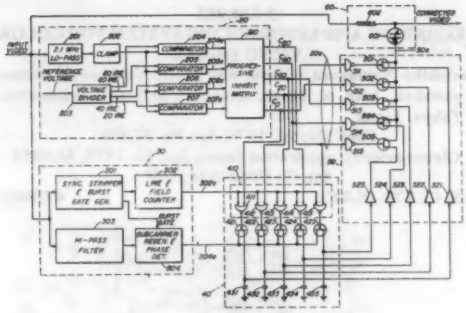
3,730,984
METHOD AND APPARATUS FOR AUTOMATIC VIDEO DISTORTION CORRECTION

Clyde Smith, North Salem, N.Y., assignor to Columbia Broadcasting System, Inc., New York, N.Y.

Filed March 31, 1972, Ser. No. 240,195
Int. Cl. H04n *5/20, 7/10, 9/02*
U.S. Cl. 178—6 **21 Claims**

An apparatus that receives input video which includes picture video and test signals that occur periodically between segments of picture video. The test signals contain video distortion errors dependent on at least one varying property of input

video. The system automatically generates corrected picture video, the degree of correction depending on errors extracted from the test signals. In a preferred embodiment of the invention, separate storage units are provided to store error signals



associated with differential gain and differential phase. Stored error signals, which are updated every video frame, are selectively used in corrective fashion, the instantaneous correction amount depending on the instantaneous luminance level of video picture information.

3,730,985

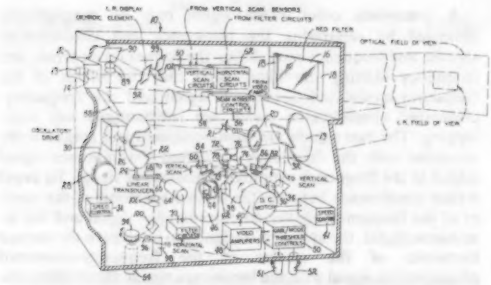
VIEWING AND MEASURING SYSTEM FOR REMOTE THERMAL ENERGY SOURCES

Theodore R. Whitney, Woodland Hills, Calif., assignor to Frank D. Orloff, Oildale; Everett C. Murray, Bakersfield and Miles I. Rider, Delano, Calif.

Filed Sept. 18, 1970, Ser. No. 73,488

Int. Cl. G01j *5/02*; G01t *1/16*; H04n *7/18*

U.S. Cl. 178—6.8 **42 Claims**



A system for analyzing the temperature and other radiant energy characteristics of remotely located radiant energy sources which is provided with both an optical viewing system having a selected field of view, and a scanning and electronic display system viewing at least a portion of the selected field of view. The optical system provides a relatively wide information bandwidth display presenting an optical image having high detail but relatively low contrast, while the scanning and display system provides a relatively narrow information bandwidth display presenting a generated image with an extremely high level of contrast, typically of infrared sources having predetermined energy levels. The generated image preferably is in a distinct color from the optical image, and the images are superimposed for viewing by an operator in a manner such as to be distinctly displayed and spatially related.

3,730,986

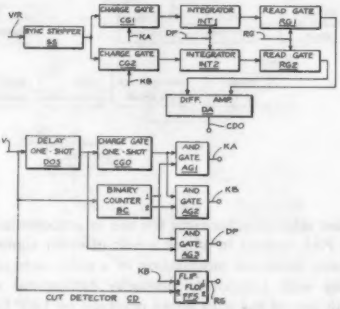
TELEVISION TRANSMISSION SYSTEM FOR TWO CLASSES OF INFORMATION

Charles A. Morchand, New York, N.Y., assignor to Data-Plex Systems, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 862,593, Aug. 26, 1969. This application April 5, 1971, Ser. No. 131,231

Int. Cl. H04n *7/08*

U.S. Cl. 178—5.6 **9 Claims**



A television transmission system normally transmits fields of general viewer information which is interspersed with cuts. After at least some of the cuts a field of special viewer information is transmitted instead of the field of general viewer information. Associated with the field of special viewer information is a characteristic signal to identify the field so that a special television receiver, upon sensing the signal, can extract the field of special viewer information for display.

3,730,987

HORIZONTAL APERTURE CORRECTION WITH VARIABLE CHARACTERISTIC

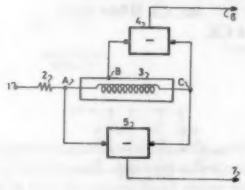
Helmut Radecke, Darmstadt Am Alten, Germany, assignor to Robert Bosch Fernsehanlagen GmbH, Darmstadt,

Filed May 12, 1971, Ser. No. 142,728

Claims priority, application Germany, May 12, 1970, P 20 22 971.4

Int. Cl. H04n *5/14*

U.S. Cl. 178—7.1 **9 Claims**

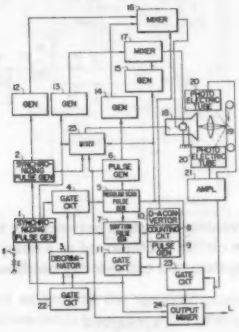


A correction signal with a variable frequency characteristic especially for aperture correction of television signals in which a broad-band signal is fed into a delay device which is connected to difference amplifiers with opposite input polarity to separate and filter two signals and to cause portions of the signals to coincide. The resultant signals are mixed and may be attenuated for producing the correction signal of variable characteristic.

3,730,988
ELECTRONIC TRANSMISSION SYSTEM OF STATIC PICTURE WRITINGS

Takehiro Shimizu, Setagayaku, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed July 29, 1970, Ser. No. 167,423
Claims priority, application Japan, July 29, 1970, 45/66378
Int. Cl. H04n 7/12
U.S. Cl. 178—6.8 **3 Claims**

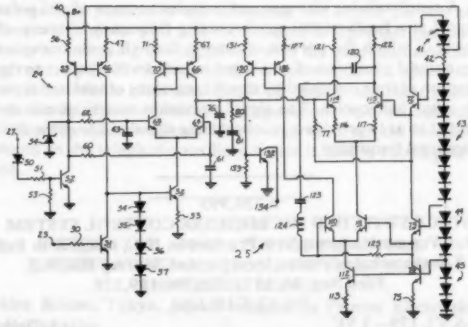


The time required to electronically transmit the contents of a document, such as a picture or a printed paper, is markedly reduced. The document is divided into minute squares and each square is scanned by a preliminary scan for detecting the presence or absence of useful information. The preliminary scan is much more rapid than the regular scan used for forming a transmittable document image. Only those squares having useful information are scanned by the regular scan to form images which are transmitted. Sync pulses and shift pulses are transmitted along with the image signals to allow the receiver to properly position the image signals in generating a reproduction of the document.

3,730,989
TELEVISION HORIZONTAL TRANSISTOR OSCILLATOR AND AFC NETWORK

Dong Woo Rhee, Williamsville, N.Y., assignor to GTE Sylvania Incorporated, Seneca Falls, N.Y.

Filed Dec. 13, 1971, Ser. No. 207,216
Int. Cl. H04n 5/04; H03b 3/04, 5/12
U.S. Cl. 178—7.5 R **10 Claims**

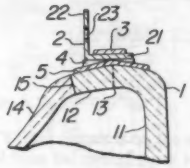


The oscillator includes first and second transistors and first and second resistors serially connected between the emitters of the first and second transistors, the base of the first transistor is connected to receive a control voltage and the base of the second transistor is biased at a reference voltage, a third transistor is connected to the common junction of the first and second resistors, a positive feedback circuit is connected from the collector of one of the first and second transistors to the third transistor, and a capacitor is connected between the collectors of the first and second transistors. The AFC network receives an output derived from the oscillator output and with two integrators of different time constants generates two signals which are fed to a switching phase comparator together with a reference synchronizing signal to generate the oscillator control signal.

3,730,990
IMPLOSION-PROOF CATHODE-RAY TUBE

Yoshihiko Miyata, Mobara, and Noritada Katoh, Kitatamagun, Tokyo, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed July 28, 1970, Ser. No. 58,866
Claims priority, application Japan, Aug. 1, 1969, 44/72609
Int. Cl. H01j 61/50; H01k 1/28
U.S. Cl. 178—7.8 **5 Claims**

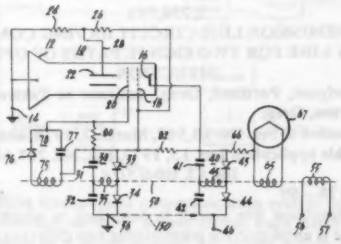


An implosion-proof cathode-ray tube which is provided with a reinforcing band for tightening the side walls of a joined portion what is called a mold-match portion, between a face portion and a skirt portion of a panel portion of a glass-made envelope through the so-called pad assemblies disposed on the four corners of the joined portion and each comprising a metallic fixture for a cabinet and a pad connected with the fixture, and in which a hardenable bulking agent is filled into gaps between the side walls of the joined portion or a single-side adhesive tape surrounding said side walls of the joined portion and the pads, thereby increasing the implosion-proof force and facilitating the location of the fixtures.

3,730,991
GROUNDED FACEPLATE KINESCOPE SYSTEM

Robert Fincher Sanford, Princeton Junction, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Jan. 22, 1971, Ser. No. 108,921
Int. Cl. G01d 15/14; H04n 1/22; H01j 29/52
U.S. Cl. 178—7.5 R **6 Claims**



The electron gun of a kinescope is operated at a negative high voltage so as to permit its thin faceplate to be grounded to reduce the possibility of "punch-through" while still maintaining reasonable spot size. Signals to be displayed are direct current coupled to the cathode of the electron gun through a first power supply of substantially the same magnitude as a second power supply providing the high voltage potential to the control grid. The use of a thin faceplate kinescope enables increases in light efficiency for recording on electrophoto-

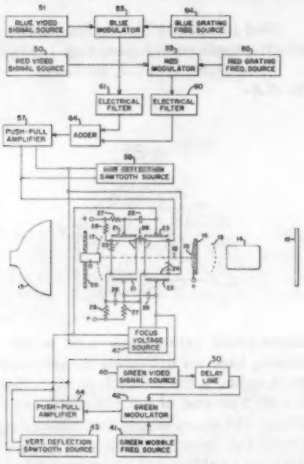
graphic paper while the use of the direct current coupling provides an average brightness level which is substantially independent of the instantaneous value of applied signal amplitude.

3,730,992

LIGHT VALVE PROJECTOR WITH IMPROVED IMAGE DETAIL AND BRIGHTNESS

Thomas T. True, Camillus, N.Y., assignor to General Electric Corporation, Syracuse, N.Y.

Filed Dec. 17, 1970, Ser. No. 99,058
Int. Cl. G02f 1/34; H04n 9/12
U.S. Cl. 178—5.4 BD **17 Claims**



Vestigial filtering of each of the modulated red and blue electrical carriers in a light valve projector reduces light energy of the particular wavelength diffracted by optical diffraction gratings resulting from one electrical sideband and blocked by Schlieren optics output bars, and increases light energy of the same wavelength diffracted by optical diffraction gratings resulting from the other electrical sideband and passed through the Schlieren optics output slots. The red signal filter attenuates lower sideband energy and transmits upper sideband energy, and the blue signal filter attenuates a portion of upper sideband energy and transmits lower sideband energy. A delay line in the green video circuitry equalizes time delay introduced by the filters.

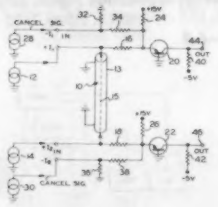
3,730,993

TRANSMISSION LINE CIRCUIT HAVING COMMON DELAY LINE FOR TWO SIGNAL PATHS OF OPPOSITE DIRECTION

Hiro Moriyasu, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Continuation of Ser. No. 15,567, March 2, 1970, abandoned. This application Jan. 13, 1972, Ser. No. 217,647
Int. Cl. H04l 5/14
U.S. Cl. 178—59 **14 Claims**

A transmission line circuit is described in which a single delay line is employed for transmitting two different signals in opposite direction therethrough to provide the same time delay in both signals with no distortion. The transmission line is terminated at both ends in its characteristic impedance by a termination resistor approximately equal to such characteristic impedance connected in series with the emitter to base junction resistance of a termination transistor connected as a common base amplifier. A signal cancellation means is connected to the emitter of each transistor to cancel the undelayed portion of the input signal transmitted through the termination resistor while enabling the delayed portion of such input signal to be transmitted through the delay line to the output at the collector of the other termination transistor



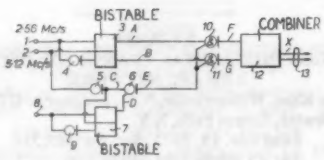
and thereby preventing crosstalk between the two signals. The transmission line circuit is employed as a delay line in the vertical deflection system of a cathode ray oscilloscope.

3,730,994

SYNCHRONIZING ARRANGEMENTS

John Brian Terry, Great Totham, Maldon, Essex, and David Fleming Corlett, Chelmsford, both of England, assignors to The Marconi Company Limited, London, England

Filed Aug. 31, 1970, Ser. No. 68,210
Claims priority, application Great Britain, Aug. 30, 1969, 43,277/69
Int. Cl. H03k 5/13; H04l 7/08
U.S. Cl. 178—69.5 TV **7 Claims**



A synchronizing arrangement includes a source of a bi-polar signal at a fundamental synchronizing frequency in every n^{th} cycle of which the portion of time in the half cycle occupied by a signal excursion of one sense is varied with respect to the portion of time occupied by signal excursions of said one sense in other half cycles. The signal excursion variations are detected so as to provide a synchronizing signal at $1/n$ of the fundamental frequency.

3,730,995

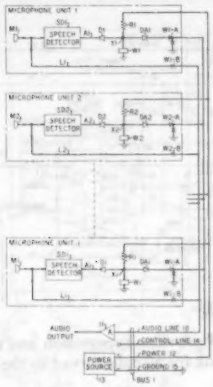
VOICE SWITCHED MICROPHONE CONTROL SYSTEM

Max Vernon Mathews, New Providence, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 16, 1971, Ser. No. 199,228
Int. Cl. G10l 1/04
U.S. Cl. 179—1 VC **1 Claim**

Voice activated control apparatus selectively connects one of a plurality of microphones to an audio line and inhibits all other microphones from capturing the line while the initial connection is maintained. Each microphone is connected to an associated speech detector and relay. In response to voice signals from a microphone, the associated speech detector activates a relay which connects the microphone to the line and

generates a signal which inhibits the other relays. Other users cannot interrupt the present speaker because their relays



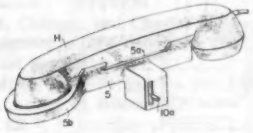
remain inhibited as long as the speaker continues. The same circuitry can accommodate any number of microphones.

3,730,996

TELEPHONE AUXILIARY DEVICE

Tadahisa Iwasaki, Sumida-ku, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed July 28, 1971, Ser. No. 166,847
Claims priority, application Japan, July 29, 1970, 45/75553
Int. Cl. H04m *1/00*
U.S. Cl. 179—1 HS **4 Claims**



A telephone auxiliary device has a housing adapted to be seated on a telephone body with a handset removed, the handset being placed on the housing. Within the housing there are disposed a movable plate pivoted at one end to the housing and provided at the other end with an adapter button for detecting a handset; a hook button actuating plate pivoted at its intermediate portion to approximately the center portion of the movable plate, with one end coupled to a plunger responsive to an incoming bell signal and with the other end extending over the hook buttons of the telephone; and a spring to bias the movable plate and the hook button actuating plate into closely adjacent positions. In operation, the hook buttons of the telephone are allowed to move upward, but the handset placed on the telephone auxiliary device is held in a fixed position.

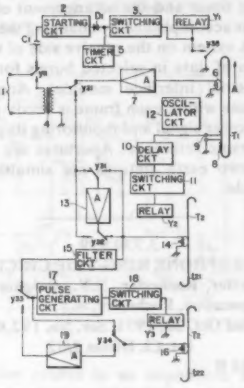
3,730,997

METHOD AND APPARATUS FOR REMOTELY MANIPULATING AN AUTOMATIC TELEPHONE ANSWERING DEVICE

Akira Konno, Tokyo, Japan, assignor to Pioneer Electronic Corporation

Filed May 19, 1970, Ser. No. 38,854
Claims priority, application Japan, May 19, 1969, 44/38088
Int. Cl. H04m *1/64*
U.S. Cl. 179—6 **4 Claims**

This is a device for remotely listening to a message of a calling party previously recorded in a telephone answering device in the owner's absence. This is accomplished by providing a first and second track in one message recording tape, for recording the message signal from a calling party. The recorded message signal from the calling party and a remote manipulating signal sent by a remote manipulating person are on the first track, and only the remote manipulating signal



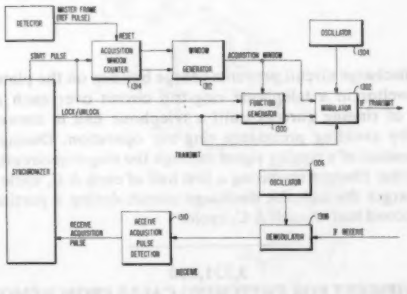
recorded through a filter circuit is on the second track. When the message signal from the calling party recorded on the first track is remotely listened to all functions of the device are returned to the stand-by state by the use of the remote manipulating signal which is read out from the second track after all of the message signals have been read out.

3,730,998

TDMA SATELLITE COMMUNICATIONS SYSTEM WITH AN APERTURE WINDOW FOR ACQUISITION

William G. Schmidt, Rockville; Ova G. Gabbard, Germantown, both of Md.; John M. Husted, Vienna, Va.; Wilfrid G. Maillet, Oxon Hill, and Marinus A. Bos, Rockville, both of Md., assignors to Communications Satellite Corporation, Washington, D.C.

Filed Aug. 11, 1971, Ser. No. 170,932
Int. Cl. H04j *3/06*
U.S. Cl. 179—15 BS **4 Claims**



In a satellite transponder communication system operating in a time division multiple access mode, each earth station transmits data in a burst format. All bursts within a single transponder frame are synchronized to a special reference burst which contains no data communications. A single earth station sends out the reference burst as well as its normal burst, and in the case of multi transponders and multi transponder frames, the single reference station sends out all of the reference bursts for the various transponder frames. Data to be transmitted may be received in many different forms and included within the same burst because of the modular arrangement of the earth stations. Individual terrestrial interface modules receive data in various forms, convert the data into

bit form which is compatible with the TDMA system, store the converted bit stream and hold the block of data until a multiplexer requests the block of data for inclusion into the earths station's transmitted burst. The arragnement of blocks of data within a burst and the timing and duration of a burst is controlled by digital words stored in a memory. Complete reordering of burst times and the arrangement of blocks of data within a burst is accomplished by changing the words stored in the memory. A system on the receive side of the earth station extracts blocks of data in selected bursts for conveyance to selected terrestrial interface modules. Acquisition of the proper burst time within each frame is accomplished by sending out a low power signal and monitoring its phase relative to the received frame reference. Apertures are provided to insure that no two earth stations are simultaneously in the acquisition mode.

3,730,999

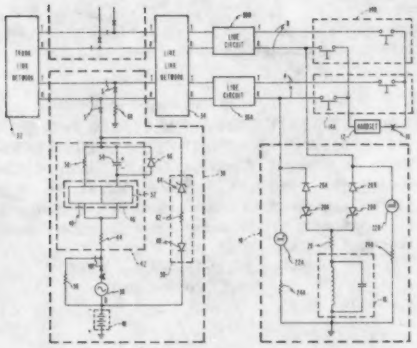
TELEPHONE RING-TRIP CIRCUIT

William E. Shaffer, Rochester, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed Oct. 26, 1971, Ser. No. 192,020

Int. Cl. H04m *3/02*

U.S. Cl. 179—84 R **11 Claims**



A discharge circuit prevents charge buildup on the plates of a capacitor in a telephone ring-trip circuit over each A.C. cycle of ringing current until a telephone call is answered, thereby avoiding premature ring-trip operation. During the application of a ringing signal through the ring-trip circuit, the capacitor charges up during a first half of each A.C. cycle and discharges through the discharge circuit during a portion of the second half of each A.C. cycle.

3,731,000

EQUIPMENT FOR SWITCHING CALLS FROM REMOTE TRUNK GROUPS TO DISTANT CENTRALIZED OPERATOR SERVICE CENTER

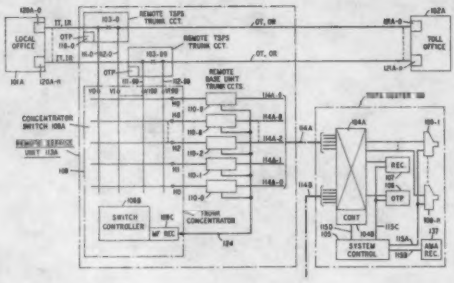
Amos Edward Joel, Jr., South Orange, N.J., assignor to Bell Telephone Laboratories, Inc., Murray Hill, N.J.

Filed Dec. 16, 1970, Ser. No. 98,801

Int. Cl. H04m *15/26, 3/00*

U.S. Cl. 179—8 R **20 Claims**

A telephone system is disclosed in which centrally located traffic service position system (TSPS) equipment cooperates with groups of remotely situated trunks to provide the operator service required on the person-to-person type calls served by the trunks. A crossbar type switch operating as a concentrator at each remote location temporarily interconnects calling ones of the remote trunks with digit receivers, outpulsers, and operator positions at the TSPS center. The TSPS



equipment also provides supervision and charge data recording via a data link for all calls served by the trunks.

3,731,001

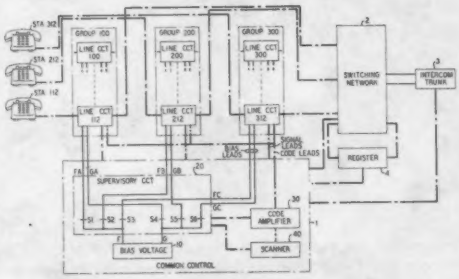
MULTIPLE LINE SCANNING SWITCHING SYSTEM

David Lee Fairchild, Broomfield, and Michael Stephen Lane, Boulder, both of Colo., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 30, 1971, Ser. No. 213,907

Int. Cl. H04q *3/72, 3/24*

U.S. Cl. 179—18 FH **13 Claims**



A switching system arrangement for simultaneously scanning multiple groups of line circuits to locate calling and called stations connected to concurrently scanned ones of the line circuits. A supervisory circuit selectively removes bias voltage from one lead of pairs of bias leads extending to idle and busy ones of the line circuits assigned to the concurrently scanned line circuits to facilitate the identity of a line circuit connected to a calling station. Subsequently, the supervisory circuit removes bias voltage from the pair of bias leads extending to the group of line circuits wherein the line circuit connected to the called station is located. Finally, the switching system interconnects the calling station and the called station through the line circuits identified from the ones of the concurrently scanned line circuits.

3,731,002

INTERCONNECTED LOOP DATA BLOCK TRANSMISSION SYSTEM

John Robinson Pierce, Warren Township, Somerset County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

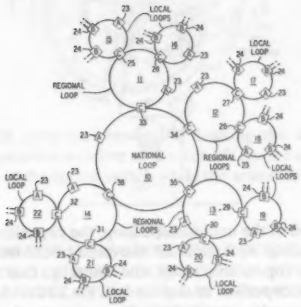
Filed Oct. 8, 1970, Ser. No. 79,185

Int. Cl. H04j *3/08*

U.S. Cl. 179—15 AL **11 Claims**

A closed loop transmission system is described in which a plurality of stations have access to each loop to write messages

into and read messages from standard-sized message blocks transmitted around the loop. One station in each loop provides regeneration of all message blocks. The various loops are interconnected by switching stations which respond to address information at the head of each message block to selectively switch the block to the interconnected loop. The next required address is always substituted for the current address to simplify address recognition. Alternate and redundant routing are also provided for.



3,731,003

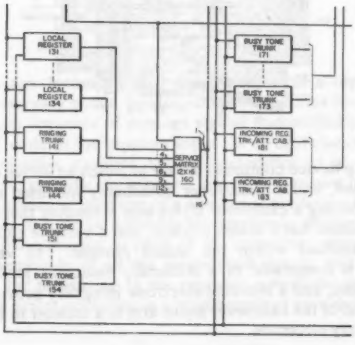
NON-DIAL STATION SERVICE FOR PABX TELEPHONE SYSTEM

Elmer W. Krock, Chicago, and Charles J. Simon, Hinsdale, both of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed July 22, 1971, Ser. No. 165,252

Int. Cl. H04m *3/42*

U.S. Cl. 179—27 FF **3 Claims**


LOCAL REGISTER 131
LOCAL REGISTER 134
RINGING TRUNK 141
RINGING TRUNK 144
BUSY TONE TRUNK 151
BUSY TONE TRUNK 154
SERVICE MATRIX 12 x 16 150
BUSY TONE TRUNK 171
BUSY TONE TRUNK 173
INCOMING REG TRK/ATT CAB 181
INCOMING REG TRK/ATT CAB 183

A private automatic branch telephone system controlled by a central processor to interconnect stations. Included are an attendant cabinet, central office trunks, a paging circuit and attendant's link circuits that are initially operable to connect a central office trunk to an associated attendant cabinet and further operated to access the paging circuit.

3,731,004

IMPEDANCE MATCHING CIRCUIT FOR TONE RINGING

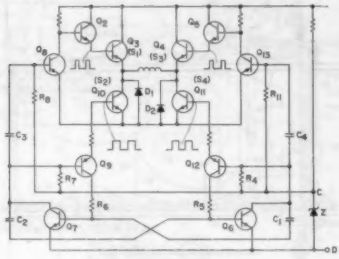
Michael C. J. Cowpland, and Donald A. Draper, both of Ottawa, Ontario, Canada, assignors to Microsystems International Limited, Montreal, Quebec, Canada

Filed June 1, 1971, Ser. No. 148,530

Claims priority, application Canada, May 28, 1971, 114,223

Int. Cl. H04m *1/76*

U.S. Cl. 179—84 T **3 Claims**



The invention relates to an impedance matching circuit designed to minimize current drain on the supply thereto while maintaining maximum current driving efficiency through a load and particularly adapted to drive an inductive load. The invention has particular applicability to the field of telephony, in that the circuit may be used to drive a tone ringer for a telephone set.

3,731,005

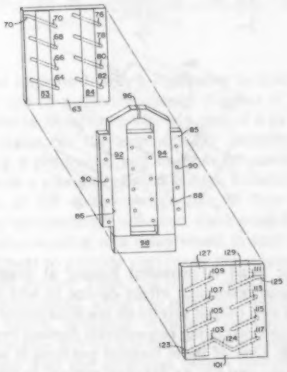
LAMINATED COIL

Paul M. Shearman, Plainville, Mass., assignor to Metalized Ceramics Corporation, Providence, R.I.

Filed May 18, 1971, Ser. No. 144,609

Int. Cl. G11b *5/20*; H01f *5/00*

U.S. Cl. 179—100.2 C **15 Claims**



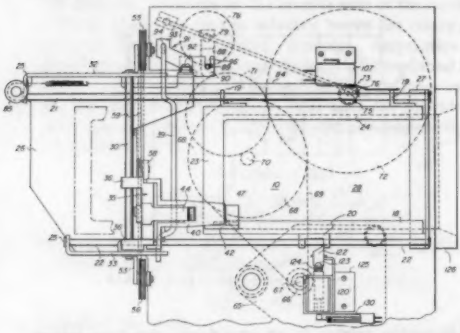
A coil having a core and method of fabricating that coil by forming layers of green ceramic, forming openings and depositing metal in predetermined patterns in and through the layers, assembling the layers with the metalized patterns so arranged as to form three-dimensional conductive paths, and firing the green ceramic layers simultaneously to bond the metal to the ceramic and to vitrify the ceramic. The openings may be formed by mechanical means or the layers may be discontinuous and staggered relative to each other to form the openings for the insertion of the core or cores about which the three-dimensional paths form coils.

3,731,006

DEVICE FOR SELECTIVELY REPRODUCING SOUND ON ONE OF A PLURALITY OF TRACKS

John G. Streiffert, and Edward Muka, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed June 7, 1971, Ser. No. 150,698
Int. Cl. G11b *21/12, 21/04*
U.S. Cl. 179—100.2 MD **17 Claims**



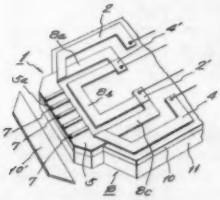
Reproducing apparatus comprises a device for selectively positioning a transducer head with respect to a selected one of a plurality of tracks on either of two opposed planar surfaces of a record medium and for rendering operative the transducer head associated with the selected track for reproducing information thereon.

3,731,007

MAGNETIC HEAD HAVING A MAGNETO-RESISTIVE BRIDGE CIRCUIT

Noboru Masuda, Kawaguchi City, Saitama Prefecture; Masahi Kuroyanagi, Kohtoku, Tokyo, and Hiroaki Kase, Shinagawaku, Tokyo, all of Japan, assignors to Denki Onkyo Co., Ltd., Tokyo, Japan

Filed April 19, 1971, Ser. No. 135,238
Int. Cl. G11b *5/30*; H01c *7/16*
U.S. Cl. 179—100.2 CH **27 Claims**



A magnetic head is provided having at least one loop-shaped magneto-resistance effect device to which two input terminals and two output terminals are alternately connected, four resistor portions being respectively formed between these four terminals. One of these resistor portions is selected as a detector portion and has an external surface arranged to contact a magnetic flux applying means, such as a magnetic tape.

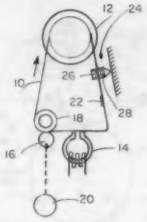
3,731,008

CIRCUIT FOR ENERGIZING AND DE-ENERGIZING A RELAY TO CONTROL THE OPERATION OF A TAPE RECORDER

Kalju Meri, Maspeth, N.Y., assignor to Electrospace Corporation, Bronx, N.Y.

Filed April 9, 1971, Ser. No. 132,782
Int. Cl. G11b *15/06, 27/24*
U.S. Cl. 179—100.2 S **11 Claims**

A circuit for energizing and de-energizing a relay to start and stop a tape recorder receiving an endless tape loop provided with an electrically conductive foil disposed on a portion thereof. The circuit includes a capacitor in series with the relay so that when an energizing member is activated, the capacitor which is initially charged is then discharged across the relay to start the tape recorder and thereby cause movement of the endless tape loop. When foil sensing contact members, associated with the capacitor, are engaged by the moving



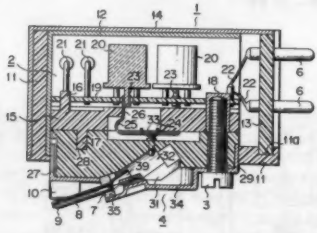
conductive foil of the endless tape loop, the capacitor which is recharged during operation of the tape recorder is again discharged to open the relay and thereby stop the tape recorder. The capacitor is disposed in the circuit to provide for the tape recorder starting in both conditions where the foil sensing contact members are engaged and are out of engagement with the conductive foil.

3,731,009

PHONOGRAPH PICKUP HAVING CAPACITIVE TRANSDUCER DIRECTLY COUPLED TO CANTILEVER STYLUS ARM

Shoji Watanabe, Shibuya-ku, Tokyo, and Nobuo Yakushiji, Totsuka-ku, Yokohama-shi, Kawasaki, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan

Filed Aug. 17, 1971, Ser. No. 172,591
Claims priority, application Japan, Nov. 4, 1970, 45/96422; Aug. 17, 1970, 45/81430
Int. Cl. H04r *19/10*; G11b *3/00*
U.S. Cl. 179—100.41 K **4 Claims**



A pickup device comprises a base in which an active circuit is assembled, and a transducer detachably mounted on the base and having a cantilever stylus arm extending therefrom. The transducer has a sealed portion, and a variable capacitor portion disposed within the sealed portion. The variable capacitor is comprised of a stationary electrode having an electret plate, and a movable electrode integrally provided at the rear end of the cantilever stylus arm in a manner to face to the stationary electrode.

3,731,010

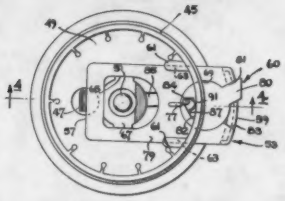
LATCHING TELEPHONE CUT-OFF SWITCH

Robert S. Goodrich, 27901 S. Golden Meadow Drive, Palos Verdes Peninsula, Calif.

Filed March 15, 1972, Ser. No. 234,946
Int. Cl. H04m *1/19*
U.S. Cl. 179—167 **7 Claims**

In a telephone cut-off device for a telephone transmitter, which comprises an insert housing disposed between the

mouthpiece of the transmitter and the main transmitter housing, having a spring switch means therein and a slidable switch actuator extending outwardly from the device, the improvement which comprises means for locking the actuator in a depressed position relative to the cut-off device causing a displacement of the spring switch while the actuator is so locked.

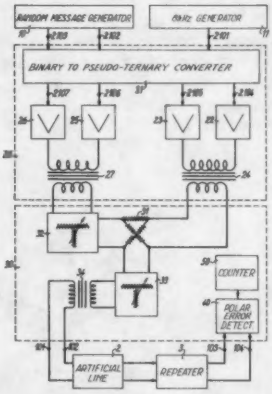


3,731,011

SYSTEM FOR MEASURING THE REGENERATION THRESHOLD OF REPEATERS FOR MULTIPLEX PULSE CODE MODULATION AND DATA TRANSMISSION SYSTEMS

Jean M. Lachaise, 28 rue des Freres Lumiere, Fresnes, France

Filed Nov. 22, 1971, Ser. No. 200,805
Claims priority, application France, Dec. 3, 1970, 7043522
Int. Cl. H04b *3/46*
U.S. Cl. 179—175.31 R **5 Claims**



A system for supervising the operation of a repeater for pseudo-ternary coded signals, comprising means for applying a random sequence of message signals transmitted in pseudo-ternary code to the repeater input via an artificial line whose characteristics simulate the characteristics of a real line; means for periodically injecting into such sequence measuring signals having at least one of a number of predetermined compositions; means for adjusting the amplitude relationship of a single pulse chosen in each of the measuring signals to the peak amplitude of all the transmitted signals; and counting means for measuring at the repeater output the number of polarity errors occurring in a predetermined period of time.

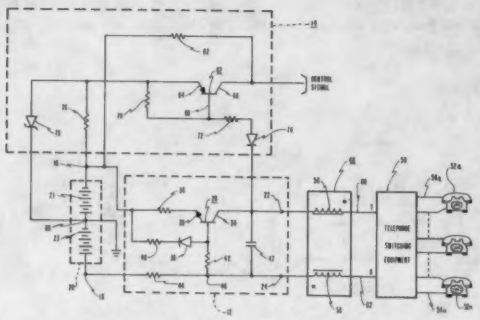
3,731,012

CURRENT LIMITING AND RESISTANCE MONITORING CIRCUIT

William E. Shaffer, Rochester, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed Sept. 30, 1971, Ser. No. 185,180
Int. Cl. H04b *3/46*
U.S. Cl. 179—175.3 **5 Claims**

A current limiting and resistance monitoring circuit provides a means for limiting the amount of current flow to a telephone connection connected thereto and for generating a control signal having a level that is a function of the resistance of the telephone connection.

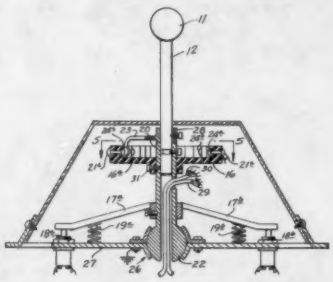


3,731,013

SWITCH CONTROL MEANS

Charles D. Nightengale, Rural Route 3, Box 70, Scott City, Kans.

Filed Jan. 7, 1972, Ser. No. 216,134
Int. Cl. H01h *3/02*
U.S. Cl. 200—4 **11 Claims**



A new and improved switch controller is described which permits any one of a predetermined number of switch controlled devices to be actuated in any one of a predetermined number of states. In the embodiment described, a rotary switch having a predetermined number of positions is interconnected with a plurality of push-button switches, so that for any position of the rotary switch one of four push-button switches may be selectively actuated. Each push-button switch can actuate the winding of a relay which in turn closes its associated contacts to provide current to the solenoid of a solenoid activated device. Thus, the rotary switch selects the apparatus to be actuated, while the selected push-button switch determines which solenoid winding associated with the selected apparatus will be energized with current. Described in conjunction with the aforesaid switch control device is a particular solenoid actuated device, comprising a unit for operating hydraulic valve box plungers.

3,731,014

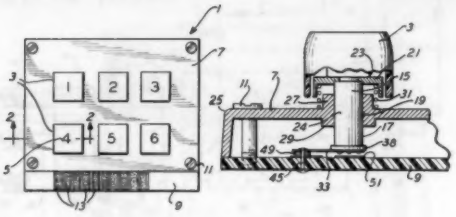
KEYBOARD SWITCH AND UNITIZED MULTIPLE SWITCH CONFIGURATION

John F. Brady, Clifton, N.J., assignor to Universal Technology, Inc., Verona, N.J.

Filed Aug. 2, 1971, Ser. No. 168,053
Int. Cl. H01h *13/52*
U.S. Cl. 200—5 A **21 Claims**

A unitized configuration including plurality of key top switches. A single unit shell overlies and is secured to a circuit

board upon which the contact leafs for the various switches are so mounted as to be cantilevered over their respective printed contacts. The plungers associated with the several key tops pass through openings in the shell and are biased out of



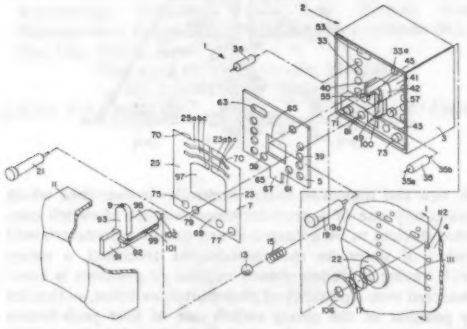
contact with the underlying cantilevered leafs by spring means. Depressing of the key tops drives the plungers downward to deflect the respective contact leafs and close the associated circuits.

3,731,015

CONTROL KEYBOARD SWITCH WITH CANTILEVERED CONTACT AND DIODE MATRIX ARRAY

John F. Brady, Clifton, N.J., assignor to Universal Technology Inc., Verona, N.J.

Filed May 18, 1971, Ser. No. 144,606
Int. Cl. H01h *13/52*
U.S. Cl. 200—5 A **18 Claims**



A low profile keyboard unit including an etched circuit board and a plurality of keyboard switches mounted on one surface thereof. Individual switches include housings configured to carry in self-contained fashion up to ten diodes plus a resistor, the leads from these elements being passed through holes in the board and flow soldered at the back side of the board.

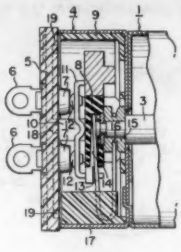
3,731,016

SWITCH WITH ARC-PREVENTION GROOVES BETWEEN PLATE SUPPORTED CONTACTS

Takeshi Nadaguchi, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka-fu, Japan

Filed June 14, 1971, Ser. No. 152,677
Claims priority, application Japan, June 6, 1970, 45/64011
Int. Cl. H01h *9/30, 19/58*
U.S. Cl. 200—11 R **4 Claims**

A variable resistor-switch having a plurality of pairs of contacts wherein a plurality of grooves are formed in order to increase the surface insulation length, thereby improving the insulating effect to higher rated voltages.

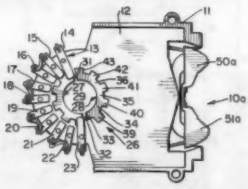


3,731,017

MULTI-POSITION SWITCH WITH IMPROVED WAFER SWITCH CONTACT ARRANGEMENT

Jean W. Runtz, Morton Grove, Ill., assignor to North American Philips Corporation, New York, N.Y.

Filed Aug. 10, 1971, Ser. No. 170,521
Int. Cl. H01h *19/58*
U.S. Cl. 200—11 D **11 Claims**



A multi-position switch for a decade resistor capable of changing the resistance between a pair of terminals monotonically from 0 to 9 units in ten equal steps in one direction and back to 0 in the eleventh step in the same direction. One resistor of unit resistance value is connected in series with four resistors of 2-unit resistance value between the terminals, and the switch contacts are arranged so that the terminals are shorted together in a first position and in each successive position the unit value resistance is alternately included in series between the terminals or short-circuited and replaced by an additional 2-unit resistor.

3,731,018

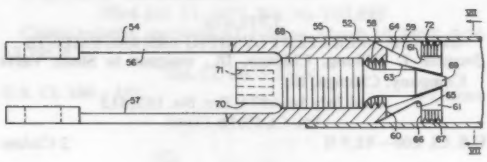
DISCONNECTING SWITCH OPERATING LINKAGE

Raymond J. Spisak, East Pittsburgh; Robert N. Becker, Irwin, and Wesley L. McKeithan, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 12, 1972, Ser. No. 261,894
Int. Cl. H01h *31/00*
U.S. Cl. 200—48 R **8 Claims**

A switch structure characterized by a plurality of spaced switch units and interconnected by movable tie rods including

adjustable connecting means between each unit and a corresponding tie rod which connecting means includes a clevis and a clamping portion comprising a plurality of spaced slots



forming slotted sections movable between contracted and expanded positions, which sections include a serrated peripheral surface adapted for seizing the inner surface of the tie rods.

3,731,019

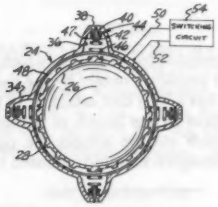
OMNI-DIRECTIONAL FORCE SENSOR

Byron T. Heurtebise, 2942 Lone Tree Road, Milford, Mich.

Filed July 23, 1971, Ser. No. 172,338

Int. Cl. H01h *35/14*

U.S. Cl. 200—61.45 R **3 Claims**



This application relates to a sensor. It is responsive to impact of predetermined magnitude from any direction. It can be mounted in a car for actuation responsive to impact of safety apparatus within an automobile.

3,731,020

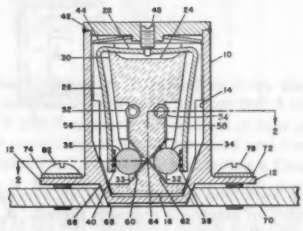
INERTIA SWITCH WITH MANUALLY ADJUSTABLE CONDUCTIVE SPRING ARM ASSEMBLY

Kenneth C. York, Pomona, Calif., assignor to General Dynamics Corporation, Pomona, Calif.

Filed Jan. 17, 1972, Ser. No. 218,329

Int. Cl. H01h *35/02*

U.S. Cl. 200—61.45 R **15 Claims**



An inertia switch capable of detecting the arrival of stress waves from any direction in the plane of the mounting surface is disclosed. In a preferred embodiment, a plurality of conductive spheres are held in a plurality of corresponding recesses by spring arms. A pair of interconnected conductors on each recess surface form, with the conductive spheres, an electrical circuit which is broken if any of the spheres is moved outwardly of its recess against the spring by any impact or stress wave in the structure. Provisions are included for adjusting the switch sensitivity by adjusting the spring preload on the spheres.

3,731,021

TIME DELAY SWITCH WITH IMPROVED DASHPOT MEANS

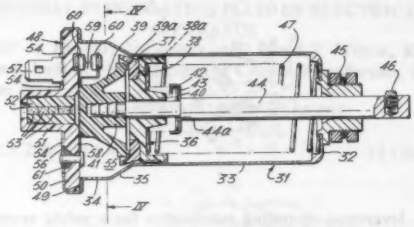
Dominoc Paul Edmund Barnard, Witney, England, assignor to Smiths Industries Limited, London, England

Filed Aug. 31, 1971, Ser. No. 176,568

Claims priority, application Great Britain, Sept. 11, 1970, 43,478/70

Int. Cl. H01h *7/03*

U.S. Cl. 200—34 **13 Claims**



An electrical time delay switch has its two electrical contacts housed within a cylinder in which a piston is slidable for operation of the contacts. The first contact is rigidly attached to an end wall of the cylinder but longitudinally spaced therefrom, and the second contact is disposed between the end wall and the first contact and is resiliently urged into engagement of the first contact by a leaf spring. The piston at the end of its stroke engages the leaf spring to break interengagement of the contacts. As the piston travels towards the leaf spring it expels air out of the cylinder at a predetermined rate through porous ceramic or sintered bronze constituents of the end wall, this predetermined rate defining the switch's time delay. Towards the end of its stroke the piston reaches a wider section of the cylinder which provides a large air leakage path round the piston to invoke sudden operation of the contacts by the piston.

3,731,022

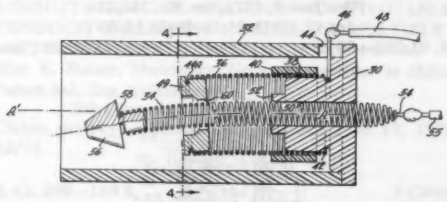
INERTIA TYPE SWITCH WITH COAXIAL CONDUCTIVE SPRINGS

Peter J. Loftus, Middletown, Pa., assignor to Alcotronics Corporation, Mt. Laurel Township, N.J.

Filed Nov. 12, 1971, Ser. No. 198,219

Int. Cl. H01h *35/14*

U.S. Cl. 200—61.49 **5 Claims**



A motion sensor for sensing shocks, vibrations or the like utilizing a pair of contacts mounted on vibratory supports so that when the supports vibrate the contacts close, completing an electrical circuit. The vibratory supports and the contacts are such that the quiescent deflections of the two supports in response to constant forces move the two contacts by the same amount to maintain a constant quiescent spacing

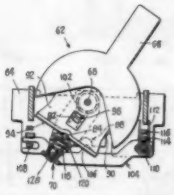
between the contacts and hence a constant sensitivity of the device to shocks, vibrations or other irregular motions. The sensitivity is therefore constant for a wide range of different quiescent orientations of the device.

3,731,023

SAFETY REVERSING SWITCH

Robert E. Sheahan, Woodbridge, and Frank J. Plumb, Prospect, both of Conn., assignors to JBT Instruments, Inc., New Haven, Conn.

Filed July 28, 1972, Ser. No. 276,248
Int. Cl. H01h *15/18*
U.S. Cl. 200—78 **5 Claims**



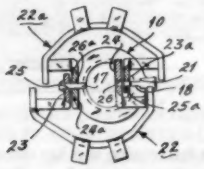
A lever-type operating mechanism for a safety reversing switch, comprising a manually operable lever having pivot means enabling it to undergo swinging movement, a U-shaped operating member disposed adjacent and actuated by the lever and having a pair of arms with elongate slots. A control means, which includes a cross pin extending through the slots, effects a snap movement of the operating member and pin when the lever is actuated. The mechanism includes an insulating slide plate which carries a switch contact and which has a slot through which the cross pin extends. The slide plate is characterized by a pair of hardened steel wear shoes, having flanges which extend into the slot of the plate to sustain impact forces from the pin during the snap movements of the latter taken over a long period of time. The wear shoes are disposed on opposite sides respectively of the slide plate and have two sets of aligned apertures by which they are rigidly fastened thereto by means of rivets. The control means further comprises a compression spring carried by the operating member and a cup also carried thereby and having an indented bottom which engages the cross pin. One end of the spring is received in the cup, such that the spring is securely positioned or oriented as it biases the cross pin toward one set of corresponding ends of the elongate slots in the arms of the operating member.

3,731,024

CENTRIFUGAL GOVERNOR

Earl A. Moody, St. Peters, Mo., assignor to Wagner Electric Corporation, Chicago, Ill.

Filed June 9, 1972, Ser. No. 261,274
Int. Cl. H01h *35/10;* **H02k** *15/00*
U.S. Cl. 200—80 R **20 Claims**



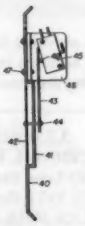
A governor device for an electric motor having a rotatable shaft is provided with a retainer plate adapted to be connected for concerted rotation with the shaft, and opposed pivot pins are integrally provided on said retainer plate respectively having free ends juxtaposed with the periphery of said shaft to retain a pair of governor weight members against displacement from pivotal engagement with said pivot pins when said shaft is connected with said retainer plate.

3,731,025

BREATH OPERATED FLUSHING ARRANGEMENTS

Jacques J. Filliung, Chicago, Ill., assignor to Sloan Valve Company, Chicago, Ill.

Filed July 14, 1971, Ser. No. 162,412
Int. Cl. H01h *35/40*
U.S. Cl. 200—81.9 R **2 Claims**



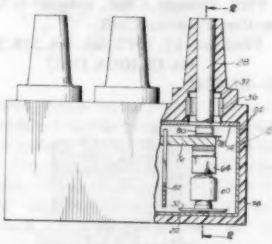
A flushing arrangement for urinals in which the flush valve is operated without physical contact by the user of the urinal. An electric switch has a thin disc attached to the switch arm, which disc is activated by the breath of the user being blown against it. The switch closure effects the operation of the urinal flush valve through a solenoid operated by the switch.

3,731,026

VACUUM SWITCHING SYSTEM

Floyd D. Miles, Saratoga, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Jan. 3, 1972, Ser. No. 215,059
Int. Cl. H01h *33/66*
U.S. Cl. 200—144 B **4 Claims**



A vacuum switching system having an evacuated housing and a plurality of electrical contacts therein. A buss is provided for internal connection to one of said contacts of said plurality of pairs. Another of said contacts may be connected to an external circuit. The other contacts of said pair are electrically connected to a shorting member and means are provided for electrically connecting and separating the pair of electrical contacts. Further, the system may comprise a plurality of sets of pairs of contacts with shielding means between adjacent sets. In addition, shielding means may be provided in the system wherever needed, in order to prevent splattering of parts of the system.

3,731,027

ELECTRICAL PRESS KEY DEVICE WITH THERMIC EXCESS CURRENT RELEASE

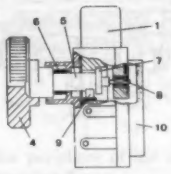
Hans Arnhold, Kalberau, Germany, assignor to Heinrich Kopp, Kahl, Main, Germany

Filed Jan. 12, 1971, Ser. No. 105,895

Claims priority, application Germany, March 18, 1970, P 20 12 748.4

Int. Cl. H01h *21/10*

U.S. Cl. 200—157 4 Claims



An electrical press key with a locking device and thermic excess current release wherein the actuating member of the locking device for the switch slide constitutes at the same time the rotary axle of a potentiometer of an electronic switching device for power regulation.

3,731,028

RELEASABLE LOCKING MECHANISM FOR PUSHBUTTON SWITCH WITH PILOT-LAMP ASSEMBLY

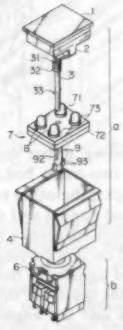
Sadao Ando, Fujisawa-shi, Kanagawa-ken, Japan, assignor to Yamatake Honeywell Co., Ltd., Tokyo, Japan

Filed Sept. 26, 1971, Ser. No. 175,102

Claims priority, application Japan, March 31, 1971, 46/23077

Int. Cl. H01h *9/02*

U.S. Cl. 200—167 A 8 Claims



A four-sided pushbutton **1** projecting from the top of a housing **4** is secured to a switch-actuating rod **3** traversing a lamp holder **7** which supports the sockets of four pilot lamps **8**, this holder consisting of two superposed and fixedly interconnected plates **71, 72** rotatably bracketing a flange **91** of a guide sleeve **9** for the rod in axially fixed position with reference to the holder. Upon depression of the pushbutton, the lower end of the rod operates a switch structure *b;* a cross-pin **33** on the rod normally engages in a pair of diametrically opposite longitudinal slots **92** of the sleeve to entrain the latter rotatorily for detaching a pair of lugs **93** at the foot of the sleeve from respective shoulders **52** in a depending neck **5** of the housing whereby, upon sufficient withdrawal of the pushbutton from the housing to enable its rotation, the lamp holder, the sleeve and the pushbutton with its rod can be bodily extracted from the housing as the cross-pin rises to the top of the slots at the level of the flange **91** to bear from below upon the upper holder plate **71.** Such rotation is prevented in a lower position of the pin **33** by a projection **72***d* depending from the lower holder plate **72;** another projection **43,** rising from the housing bottom, coacts with the depending projection **72***d* to insure correct reinsertion of the extracted unit into the housing. Proper relative orientation of the pushbutton and the pilot lamps is insured by an indexing spring **74** which normally fits into an elongate notch **31** on one side of the rod **3** to allow depression of the pushbutton **1** but which falls into another, lower notch **34** on the opposite side of the rod, blocking a descent thereof, if the pushbutton is rotated in the wrong sense to re-engage the lugs **93** of the sleeve with the shoulders **52.**

3,731,029

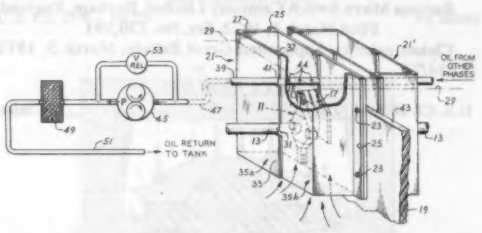
SYSTEM FOR PREVENTING CONTAMINANT DISPERSAL IN INSULATING FLUID OF ELECTRICAL APPARATUS

Arthur A. Hucker, Normandy, and David F. Winter, Kirkwood, both of Mo., assignors to Central Transformer, Inc., Pine Bluff, Ark.

Filed Jan. 20, 1971, Ser. No. 108,095

Int. Cl. H01h *33/68*

U.S. Cl. 200—150 R 14 Claims



A system for use in electrical apparatus having contacts immersed in a body of insulating fluid and adapted to open and close causing arcing therebetween which produces contaminants in the fluid. The system includes a compartment for relatively closely confining said contacts, a fluid inlet in said compartment, a filter, and means, including a pump, for withdrawing fluid from the compartment through the inlet, pumping the withdrawn fluid through the filter, and returning the filtered fluid to said body of fluid. Contaminants produced in the fluid in the compartment by arcing of the contacts are thus filtered without being permitted to disperse throughout the body of fluid. As a method of preventing contaminant dispersal, the disclosure teaches withdrawing fluid of the body from a location closely adjacent the contacts, filtering the withdrawn fluid to remove the contaminants and subsequently returning the filtered fluid to the body of fluid.

3,731,030

PUSHBUTTON SWITCH ASSEMBLY WITH PIVOTABLE CONDUCTIVE BRIDGING MEMBER AND MULTIPLE CONDUCTIVE PATH PRINTED CIRCUIT BOARD

Walter K. Holzer, Meersburg, Germany, assignor to Holzer Patent AG, Zug, Switzerland

Filed June 11, 1971, Ser. No. 152,163

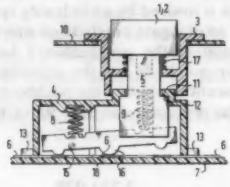
Claims priority, application Switzerland, June 17, 1970, 9168/70

Int. Cl. H01h *13/14*

U.S. Cl. 200—159 R 5 Claims

A plurality of push-button switches mounted in a housing having a printed circuit board with conductive paths thereon as a base. Each push-button switch is mounted within the housing by a spring which biases the switch in an upward direction and includes a spring engaging a contact piece so that depression of the push-button switch causes the contact piece to rock on a bearing element in contact with a conductive path of the printed circuit board. A spring mounted between the housing and a portion of the contact bridge biases

the contact bridge in a first position where a conductive path is formed by the contact bridge between the conductive bearing element and one contact on the bridge and movement of



the contact bridge by depression of the push-button switch causes a new conductive path to be formed between another portion of the contact bridge, the conductive bearing element and another contact on the contact bridge.

3,731,031

OPERATING MEMBERS FOR SNAP-ACTION SWITCHES

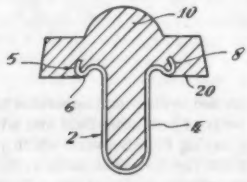
Ernest McAlpine, Bill Quay, Gateshead, England, assignor to Burgess Micro Switch Company Limited, Durham, England

Filed March 1, 1972, Ser. No. 230,591

Claims priority, application Great Britain, March 3, 1971, 5,884/71

Int. Cl. H01h *3/02*

U.S. Cl. 200—172 R **4 Claims**



An operating member, and method of producing same, for reciprocation within a close-fitting bore of a snap-action switch, the member including a guide pin having a hollow, deep-drawn shank portion with a consequential high-quality external finish thereto, an end portion of the guide pin comprising an increased-diameter shoulder forming the boundary of an insulating button moulded thereto and preventing deposition of the insulating material on the shank portion during the moulding process.

3,731,032

ELECTRICAL SWITCH WITH CONTACT WIPING

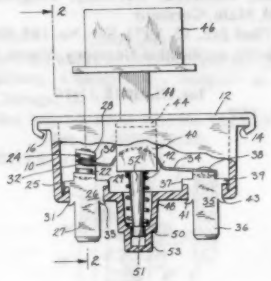
Spencer C. Schantz, Oconomowoc, Wis., assignor to U.S. Controls Corp., New Berlin, Wis.

Filed Oct. 28, 1971, Ser. No. 193,294

Int. Cl. H01h *1/36, 13/52*

U.S. Cl. 200—164 R **6 Claims**

An electrical switch having two fixed electrical contacts which are mounted within a housing in spaced-apart, face-to-face relationship. Two movable electrical contacts are mounted in back-to-back relationship on the end of a resilient arm between the two fixed contacts. The resilient arm is engaged in its central portion by an actuating plunger which is spring-loaded to hold one pair of contacts in a normally closed position and the other pair of contacts in a normally open position. Manual movement of the plunger closes the normally open contacts and opens the normally closed contacts. Release of the plunger reverses the action. The resilient arm is bowed in its central portion where it engages the actuating plunger to produce a transverse contact wiping movement of the movable contacts whenever the contacts are opened or closed to automatically clean the contacts every time the switch is used. The fixed contacts are canted to increase contact pressure and to lengthen the contact wiping movement.



The housing contains a projecting socket to provide a guide of increased bearing length for the plunger and its spring.

3,731,033

TWISTING MACHINE

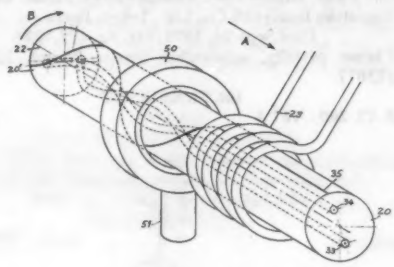
Gaston C. Ory, 7, rue des Jardies, Meudon, Hauts-de-Seine, France

Filed July 23, 1971, Ser. No. 165,046

Claims priority, application France, Aug. 5, 1970, 7028860

Int. Cl. H05b *5/02*

U.S. Cl. 219—7.5 **2 Claims**



Machine for twisting a bar between two puppets, said machine having a two-track bed, a carriage which moves along one of the tracks, the other track being provided at one extremity with a fixed puppet and with a sliding puppet at the other extremity, a high-frequency heat generator the housing of which is mounted on said carriage, a computing unit which furnishes the control signals for the heating characteristics of an inductor, the linear speed for the displacement of said carriage along its track and the angular rotational speed of the puppet spindles.

3,731,034

HEATING ROLLERS WITH AXIAL MAGNETIC FORCE REDUCTION MEANS

Koshei Arita, 10,23 2-chome, Minamimagone, Ohota-ku, Tokyo, Japan

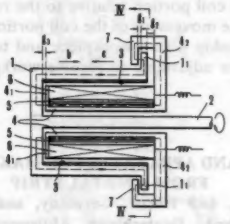
Filed March 23, 1972, Ser. No. 237,249

Int. Cl. H05b *5/08*

U.S. Cl. 219—10.49 **7 Claims**

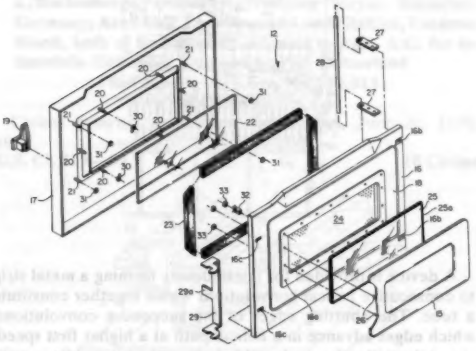
In a heating roller of the class comprising a cup-shaped cylindrical roller having a closed bottom, a driving shaft for rotating the roller connected to the center of the bottom and extending coaxially through the cylindrical roller, a stationary bobbin supported within the cylindrical roller coaxially with the driving shaft, the bobbin having an inner flange facing to the bottom and an outer flange close to the open end of the cup-shaped cylindrical roller, and an induction coil wound about the bobbin for inductively heating the cylindrical roller,

there are provided a radially extending flange at the open end of the cup-shaped cylindrical roller and a surrounding annular



ring connected to the periphery of the outer flange to surround the radially extending flange.

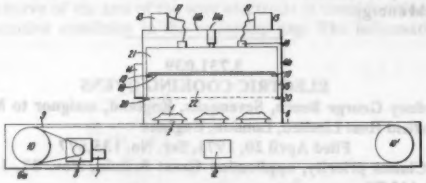
3,731,035
MICROWAVE OVEN DOOR
George A. Jarvis, and Allen M. Danley, both of Minneapolis, Minn., assignors to Litton Systems, Inc., Beverly Hills, Calif.
Filed Nov. 15, 1971, Ser. No. 198,750
Int. Cl. H05b 9/06
U.S. Cl. 219—10.55 **5 Claims**



An improved door for microwave ovens having no exposed nut and bolt type means to retain the various components of such door together. The door is so constructed that the method for taking the door apart is not readily apparent to the average microwave oven user. Various components are mounted on the interior housing panel and various other components are mounted on the exterior housing panel. Then the interior housing panel and the exterior housing panel and their associated respective components are mounted together by concealed retaining means.

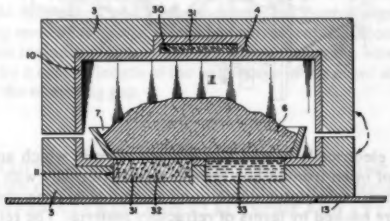
3,731,036
MICROWAVE DRYER EQUIPMENT
Bernard Lucien D. Hallier, Saint-Maur, La Varenne, and Jean Louis Coquet, 87 Saint-Leonard de Noblat, both of France, assignors to International Standard Electric Corporation, New York, N.Y.
Filed Oct. 18, 1971, Ser. No. 189,866
Int. Cl. H05b 9/06
U.S. Cl. 219—10.55 **3 Claims**

Water is removed from ceramic pieces in a pre-drying stage of a microwave drying process in which microwave energy is absorbed more in thicker dielectric sections than in thinner sections. A thin dielectric partition provides a second lower cavity in a main microwave chamber. Microwave energy heats the piece rapidly to drive out the water initially to saturate the chamber and maintains the heat to condense water vapor on



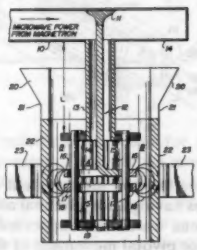
cooler surfaces. A homogeneous humidity distribution is achieved which provides fast and uniform drying.

3,731,037
MICROWAVE KILN TO COOK FOOD
Melvin L. Levinson, 1 Meinzer Street, Avenel, N.J.
Continuation-in-part of Ser. No. 704,389, Feb. 9, 1968. This application Oct. 29, 1971, Ser. No. 193,940
Int. Cl. H05b 9/06
U.S. Cl. 219—10.55 **7 Claims**



A microwave oven is provided with a heat insulating structure containing a work chamber lined with a microwave lossy material where said lining: 1) can be porous to water, 2) can represent an acceptable load to said microwave oven, 3) can define a closed cavity, 4) can be a mixture of a lossy electrical material and a lossy magnetic material, and 5) can be used in conjunction with a non-magnetic-metal, heat-conducting workload container.

3,731,038
ZERO-MODE MICROWAVE APPLICATOR
Renato G. Bosisio, Longueuil, Quebec, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Ontario, Canada
Filed Feb. 22, 1971, Ser. No. 117,538
Int. Cl. H05b 9/06
U.S. Cl. 219—10.55 **1 Claim**



A fast-mode particularly a zero-mode microwave application for the heating, drying, curing or other treatment by microwave energy of workpieces containing lossy dielectric

material having a fast wave microwave structure and microwave energization means connected to the structure to energize it such that a region adjacent said structure will contain a predominance of zero-mode or near zero-mode electric field energy.

3,731,039

ELECTRIC COOKING OVENS

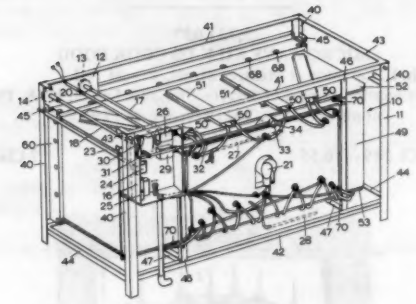
Sydney George Beech, Sevenoaks, England, assignor to Mansfield Heat Limited, London, England

Filed April 20, 1971, Ser. No. 135,577

Claims priority, application Great Britain, Nov. 27, 1970, 56,445/70

Int. Cl. F27d *11/02*

U.S. Cl. 219—407 **7 Claims**



An electrically-heated heat-storage oven in which an oven liner of open-fronted box form is fitted externally with upper and lower sole plates which carry electrical heating elements and are backed by layers of refractory material. The refractory layers are built up from cast pieces of refractory material contained within sheet metal trays, the whole assembly being held together by upper and lower horizontal clamping beams connected to one another at their ends by spring-loaded vertical tie rods.

3,731,040

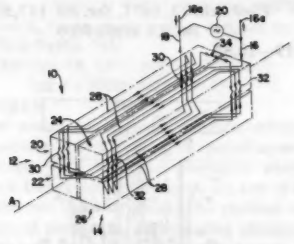
BILLET HEATING COIL

Robert Jerry Kasper, Seven Hills, Ohio, assignor to Park-Ohio Industries, Inc., Cleveland, Ohio

Filed Sept. 24, 1971, Ser. No. 183,467

Int. Cl. H05b *5/00*

U.S. Cl. 219—10.79 **18 Claims**



An induction heating coil arrangement is disclosed which includes coil means having a longitudinal axis and defined by a pair of coil portions which are supported in suspension by means providing for pivotal movement of the portions toward and away from one another in a direction lateral to the axis of the coil means. Lateral separation of the coil portions facilitates the longitudinal introduction therebetween of a metal workpiece to be heated. Support means is provided for a workpiece to be heated, and when the coil sections are laterally closed relative to one another they are disposed in inductive heating relationship with respect to a workpiece on the support means. Means are provided to vertically displace a section of each coil portion relative to the remainder thereof both to facilitate movement of the coil portions into inductive heating relationship with a workpiece and to provide for the coil means to be adjustable to receive workpieces of various thicknesses.

3,731,041

METHOD AND APPARATUS FOR MAKING A TUBE FROM A METAL STRIP

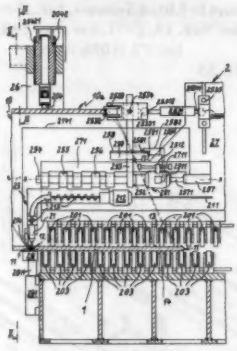
Hans Gebauer, 469 Herne, Germany, assignor to Hoesch Maschinenfabrik Deutschland Aktiengesellschaft, Dortmund, Germany

Filed June 9, 1971, Ser. No. 151,287

Claims priority, application Germany, June 10, 1970, P 20 28 560.3

Int. Cl. B23k *1/16*

U.S. Cl. 219—62 **36 Claims**



A device is provided for continuously forming a metal strip to consecutive helical convolutions which together constitute a tube. The abutting edges of the successive convolutions, which edges advance in a helical path at a higher first speed, are intermittently tack-welded by an arc-welding unit. Downstream of this unit is located another arc-welding unit which receives the thus partially welded tube and continuously welds the abutting edges, but at a lower speed.

3,731,042

WELDING MACHINE FOR MANUFACTURE OF WIRE MESH

Klaus Ritter; Hans Gott; Gerhard Ritter, and Josef Ritter, all of Graz, Austria, assignors to EVG Entwicklungs-und Verwertungsgesellschaft m.b.H., Graz, Austria

Filed Jan. 24, 1972, Ser. No. 220,306

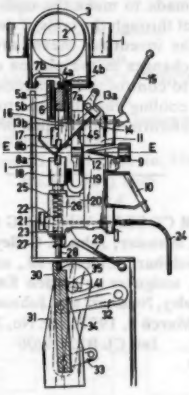
Claims priority, application Austria, Jan. 28, 1971, A 723/71

Int. Cl. B23k *1/00*

U.S. Cl. 219—56 **13 Claims**

A welding machine is disclosed of the type in which an array of longitudinal wires occupying a product plane of the machine is advanced past a transverse row of welding heads which weld transverse wires to the longitudinal wires by electric resistance welding. Each welding head comprises an electrode above the product plane and an electrode below the product plane, these being interconnected by a connecting piece which is rigid with the upper electrode and to which the lower electrode is movably mounted. A thrust beam is vertically reciprocated below the lower electrodes so that each longitudinal wire is thrust upwards against the traverse wire dur-

ing welding. Transformers for supplying the welding current and busbars for conducting the current to the welding heads



are situated above the product plane and the welding heads are suspended from the busbars.

3,731,043

DIGITAL CIRCUIT FOR AN ERODING MACHINE

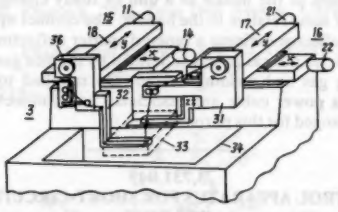
Werner Ullmann, Locarno-Muralto, Switzerland; Rudolf Panschow, Hannover, Germany; Volker Suhr, Neustadt a./Ruebenberge, Germany; Wolfgang Meyer, Hannover, Germany; Arno Sieg, Locarno, and Laszlo Rabian, Locarno-Monti, both of Switzerland, assignors to Agie, A.G. fur industrielle Elektronik, Losone-Locarno, Switzerland

Filed June 7, 1971, Ser. No. 150,511

Int. Cl. B23p *1/12*

Claims priority, application Switzerland, June 24, 1970, 9594

U.S. Cl. 219—69 V **10 Claims**



This invention relates to a digital circuit for an eroding machine designed to control a relative movement between a workpiece and a wire electrode by the input of data stored in an information carrier, the said data being translated in a circuit into the curve defined by the axis of the wire electrode in consideration of the diameter of the wire electrode and the width of the operation gap.

3,731,044

ELECTRO-ERODING MACHINE WITH A CIRCUIT FOR THE CONTROL OF AT LEAST ONE ADVANCING DEVICE FOR A WIRE ELECTRODE AND/OR FOR A WORKPIECE

Werner Ullmann, Locarno-Muralto; Laszlo Rabian, Locarno-Monti; Silvano Mattei, Locarno-Solduno; Arno Sieg, Locarno; Peter Suter, Locarno; Costantino Tadini, Locarno, all of Switzerland; Rudolf Panschow, Hannover, Germany; Volker Suhr, Neustadt, Ruebengerge, Germany, and Wolfgang Meyer, Hannover, Germany, assignors to Agie, A.G. fur industrielle Elektronik, Losone-Lorcarno, Switzerland

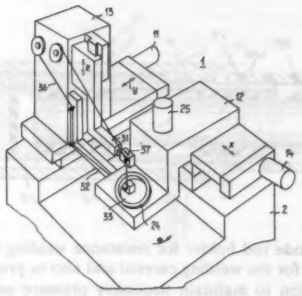
Filed June 23, 1971, Ser. No. 156,007

Int. Cl. B23p *1/04*, *1/12*, *1/14*

Claims priority, application Switzerland, July 3, 1970, 10/23

U.S. Cl. 219—69 V **14 Claims**

This invention relates to an electro-eroding machine with a circuit for the control of at least one advancing device for a wire electrode and/or for a workpiece in a workpiece contour predetermined by data stored in an information carrier, the said data being converted, in consideration of the diameter of the wire electrode and the width of the operating gap, into the path curve of the axis of the wire electrode in consideration of the erosive condition in the operating gap. The information



carrier comprises two computing units, one supplying control signals to driving means for advancing the wire electrode for a straight movement while the other supplies control signals to driving means for producing rotary movement. Each computing unit includes return memories which return the wire electrode by a certain length of the path curve in the event of trouble in the operating gap.

3,731,045

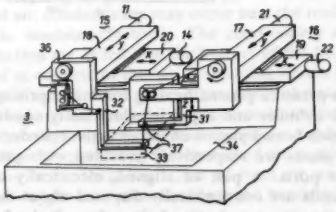
CIRCUIT FOR AN ELECTRO-ERODING MACHINE FOR THE CONTROL OF THE RELATIVE MOVEMENT BETWEEN AT LEAST ONE ELECTRODE AND AT LEAST ONE WORKPIECE

Werner Ullmann, Locarno-Muralto; Laszlo Rabian, Locarno-Monti; Silvano Mattei, Locarno-Solduno; Arno Sieg, Locarno; Peter Suter, Locarno; Costantino Tadini, Locarno, all of Switzerland; Rudolf Panschow, Hannover, Germany; Volker Suhr, Neustadt a./Ruebenberge, Germany, and Wolfgang Meyer, Hannover, Germany, assignors to Agie, A.G. fur industrielle Elektronik, Losone-Lorcarno, Switzerland

Filed July 1, 1971, Ser. No. 158,721

Int. Cl. B23p *1/12*

U.S. Cl. 219—69 V **13 Claims**

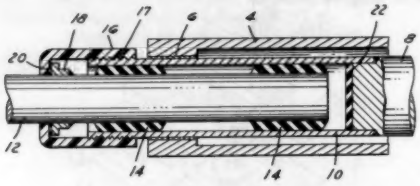


This invention relates to a circuit for an electro-eroding machine for the control of the relative movement between at least one electrode and at least one workpiece by virtue of data stored on an information carrier which relative movement contains at least one length of curve defined by the data and which data are corrected in consideration of the thickness of the electrode, the width of the operating gap, the erosive condition in the operating gap and which are supplied to at least one advancing device for the electrode and/or the workpiece as control signals generated in a computing unit by means of an interpolation process.

3,731,046
ELECTRODE ROD HOLDER FOR RESISTANCE WELDING ACTUATORS

John Henry Brems, 32867 White Oaks Trail, Birmingham, Mich.

Filed Oct. 26, 1971, Ser. No. 192,544
Int. Cl. B23k 11/10
U.S. Cl. 219—78 4 Claims

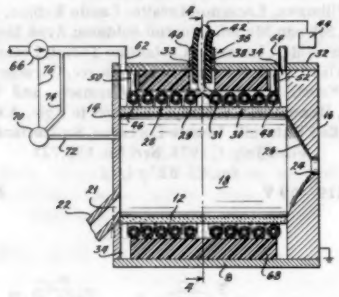


An electrode rod holder for resistance welding to serve as an insulator for the welding current and also to produce a follow-up motion to maintain necessary pressure on the parts throughout the entire weld period which includes a holding member and resilient mounts which insulate and also preload the rod holder in an axial bias to produce follow-up pressure and motion.

3,731,047
PLASMA HEATING TORCH

John H. Mullen, Saint Louis, and Edward A. Theby, Saint Ann, both of Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Dec. 6, 1971, Ser. No. 204,854
Int. Cl. B23k 9/04
U.S. Cl. 219—121 P 22 Claims

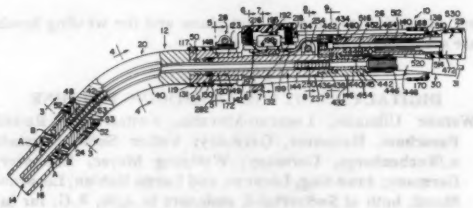


A high pressure plasma heating torch comprising a hollow dielectric cylinder and a pair of electrically conductive end plates which form a plasma chamber in the cylinder and where the end plates are respectively provided with gas inlet and discharge ports. A pair of aligned, electrically conductive heating coils are concentrically disposed about the cylinder and in this arrangement extend along the cylinder for substantially the entire length thereof. The coils are connected together at a central location and are fed energy from a relatively high voltage, high frequency electrical source and the outer or opposite ends of the coils are grounded or connected to a low potential location through the end plates so that a plasma introduced into the chamber is subjected to a relatively high energy field which extends between the two end plates, but which is developed by a source which has its highest potential near the center of the device thereby reducing the potential required and the possibility of high frequency sputtering and arcing. A cooling jacket surrounds the dielectric cylinder and forms a cooling chamber with the other parts including the parts that house the heating coils, and this cooling chamber receives a suitable coolant which is used to remove excess heat generated during operation of the device. Provision can also be made to make the coils of tubular material and to pass coolant through the coils, if desired. In a preferred embodiment of the invention, means are also provided for sensing pressure changes in the plasma chamber and in the coolant chamber to control the introducing of coolant under pressure into the cooling chamber and to thereby also maintain substantially uniform and/or equal pressure conditions in both chambers.

3,731,048
AIR COOLED WELDING GUN

Ralph Ogden, Sr., Munster; John G. Colley, Eminence, both of Mo.; Edward Neidhart, Chicago, Ill., and Carl J. Johnson, Highland, Ind., assignors to Ogden Engineering Corporation, by said Cooley, Neidhart and Johnson

Filed March 3, 1972, Ser. No. 231,670
Int. Cl. B23k 9/00
U.S. Cl. 219—130 15 Claims

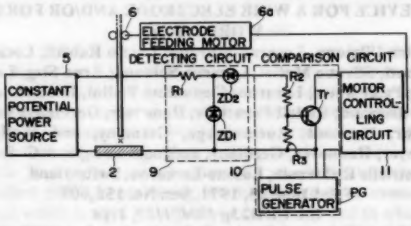


The disclosure is directed to a welding gun for MIG welding in which the gas cup and contact tip of the nozzle are secured in place by a single clamp type device that permits ready replacement of both. The nozzle in turn is connected to the gun handle by a single clamp device that permits ready replacement of the nozzle as a unit or ready change of positioning of same relative to the handle. The contact tip carries a spatter deflector defining a tapered spatter deflecting surface which shields the gas passages defined by the gun gas diffuser. Shielding gas and welding current are supplied to the gun through a power cable and associated end connectors especially arranged for this purpose.

3,731,049
CONTROL APPARATUS FOR SHORT-CIRCUIT ARC WELDING

Michiya Kiyohara, and Hisao Goto, Higashiyodogawa-ku, Osaka, Japan, assignors to Osaka Transformer Co., Ltd., Osaka-shi, Osaka-fu, Japan

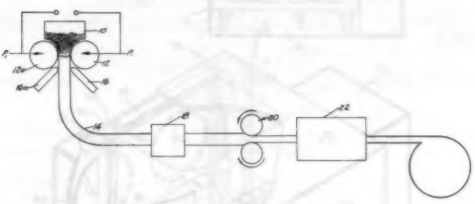
Continuation-in-part of Ser. No. 856,697, Sept. 10, 1969, abandoned. This application Sept. 27, 1971, Ser. No. 183,797
Claims priority, application Japan, Sept. 16, 1968, 43/66123
Int. Cl. B23k 9/10
U.S. Cl. 219—131 F 2 Claims



An apparatus for controlling the feeding of the welding electrode in short circuit metal transfer arc welding which em-

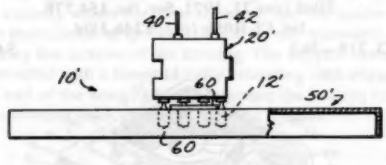
ploys a feeding speed detecting circuit. The feeding speed varies according to variations in the period of shortcircuiting between the electrode and the workpiece and the time during which a welding arc is generated.

3,731,050
METHOD OF MAKING ARTICLE FROM METALLIC POWDERS
Harry LaTour, Middletown, Ohio, assignor to Armco Steel Corporation, Middletown, Ohio
Filed June 25, 1971, Ser. No. 156,651
Int. Cl. B21j 1/06
U.S. Cl. 219—149 **19 Claims**



A method of making a continuous strip at rapid rates from metallic powders, which powders are devoid of non-metallic binders. This is accomplished by the simultaneous compacting and resistance-heating welding of the powders being fed between electrically energized rolls. The roll load coupled with a low voltage - high amperage current therebetween assures a highly dense metallic strip suitable for further metallurgical processing. Means are also provided to assure a full width of uniformly dense metallic strip substantially equal to the width of the fed metallic powders.

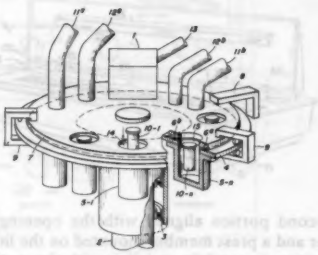
3,731,051
ARTICULATED RADIANT HEATING MODULES
Russell R. Ellersick, 7925 Twin Oak Avenue, Citrus Heights, Calif.
Filed March 26, 1971, Ser. No. 128,459
Int. Cl. C21d 1/40
U.S. Cl. 219—162 **1 Claim**



Apparatus for stress relieving a welded joint between two large diameter pipes comprises a plurality of electric heater modules hinged end-to-end so as to fit chain-like around the circumference of the pipe. Each heater module comprises several quartz bulbs projecting from an air-cooled housing in which the bases of the bulbs are supported, and a reflector to direct heat from the bulbs toward the pipe.

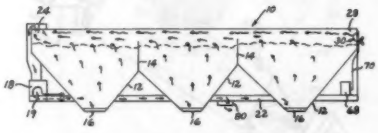
3,731,052
ELECTRON BEAM WELDING APPARATUS
Yasuhide Ogawa; Yutaka Kawase; Makoto Takada; Akira Fujioka, and Hideki Kobayashi, all of Tokyo, Japan, assignors to Nippon Electric Company, Limited, Tokyo, Japan
Filed June 2, 1971, Ser. No. 149,219
Claims priority, application Japan, June 6, 1970, 45/49332
Int. Cl. B23k 15/00
U.S. Cl. 219—121 EB **2 Claims**

Electron beam welding apparatus is disclosed in accordance with the teachings of the present invention wherein a plurality of welding chambers adapted to receive work pieces to be welded is supported in a radially outward direction by a table. A cover, concentric with the table, overlies said table and includes an electron beam source and evacuating means mounted thereon. Sealing members are interposed between the table and the cover to define an annular space therebetween, which space is maintained in a radially sealed



relationship. The table is rotated relative to the cover such that the welding chambers rotate within the annular space. A low pressure condition is produced in each welding chamber when the welding chamber is rotated into registration with the evacuating means; and the work piece contained in the low pressure environment of said welding chamber is subject to a beam of electrons when said welding chamber is rotated into registration with the electron beam source.

3,731,053
RAILWAY CAR HAVING A HEATED FRESH AIR INTAKE
Edward L. Coyle, and Dennis J. Schipper, both of Saint Charles, Mo., assignors to ACF Industries, Incorporated, New York, N.Y.
Filed Dec. 27, 1971, Ser. No. 212,415
Int. Cl. H05b 1/00
U.S. Cl. 219—202 **7 Claims**

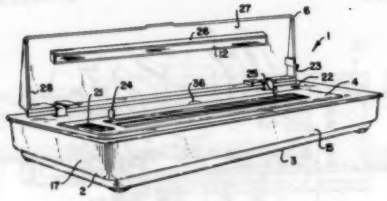


In a railway car, such as a closed hopper car, conditioned by circulated air, condensation may occur near the roof, which is difficult to insulate effectively. The conditioning air, which may be heated air, is fed into the bottom of the hoppers and exhausted at one end of the car. A shielding stream of electrically heated air admitted at the other end of the car near the roof flows along the roof and prevents moisture laden circulated air from striking the cold roof directly, and thus prevents condensation. A portion of the circulated air is exhausted to atmosphere to facilitate the inflow of fresh air, and thus increase the oxygen content and reduce the humidity when the car contains oxygen consuming, moisture emitting lading.

3,731,054
HEAT SEALER
Lester E. Bair, Brownsville, Tex., assignor to Fairshare Marketing & Manufacturing Co., Inc., Brownsville, Tex.
Filed May 19, 1972, Ser. No. 255,192
Int. Cl. H05b 1/00
U.S. Cl. 219—243 **11 Claims**

A packaging device for closing containers formed of heat sealable flexible plastic is mounted in a housing having a base portion with a compartment therein which is closed by a cover

member having an elongated opening therein and a lid is hingedly mounted on the housing and movable between a position overlying the cover member and a position spaced from the cover member. A material engaging member is positioned within the compartment and is selectively movable between a position having an edge of a first portion aligned with the opening in the cover member and a position having a surface



of a second portion aligned with the opening in the cover member and a press member mounted on the lid and movable to a position in overlying relation with the material engaging member to effect engagement of material to be heat sealed with the material engaging member which is heated to a selected temperature. The edge of the first portion of the material engaging member is effective to heat seal the container and cut the plastic adjacent the heat sealed portion.

3,731,055

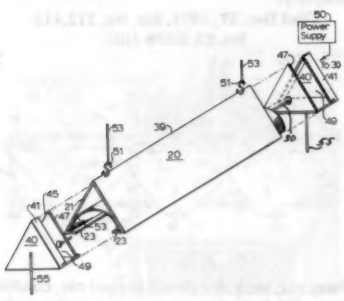
RADIANT HEATING APPARATUS

Charles F. Kerchner, Jr., Bath, and David A. Ball, Orefield, both of Pa., assignors to Kalglo Electronics Co., Inc., Allentown, Pa.

Filed Dec. 15, 1971, Ser. No. 208,159

Int. Cl. F24h 9/02; H05b 3/40

U.S. Cl. 219—349 **6 Claims**



The heating apparatus includes an elongated hood which carries an elongated heating element and an adjustable sensing element adapted to be positioned adjacent to the area or to the animals to be kept warm. The sensing element is electrically connected to a control circuit for controlling the heating current to the heating element.

3,731,056

SUPPLEMENTAL HEATER UNIT FOR AIR CONDITIONER OF THE DUAL BLOWER TYPE

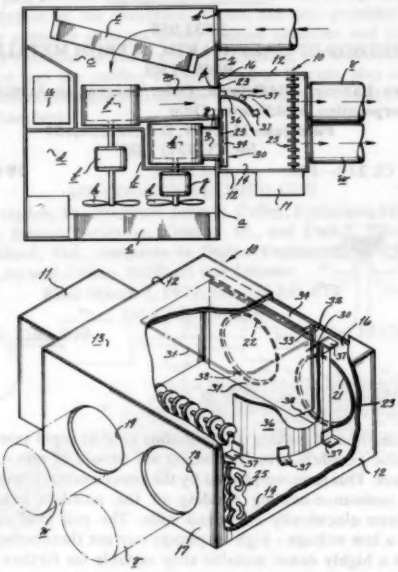
Edward A. Becker, Ferguson, Mo., assignor to Intertherm, Inc., St. Louis, Mo.

Filed Dec. 6, 1971, Ser. No. 204,998

Int. Cl. H05b 1/00; F24h 3/04; F25b 29/00

U.S. Cl. 219—361 **5 Claims**

A supplemental heater unit for an air conditioner of the dual blower type, provides reduced air delivery while the heater is energized. The heater unit has an air casing with separate inlets from the two blowers. When only one blower of the air conditioner is powered, an atmospheric damper closes automatically across the inlet from the unpowered blower, preventing re-circulation back to the air conditioner cabinet



and thus providing a positive controlled lower rate of air delivery across a resistance heater within the air casing and to the room space.

3,731,057

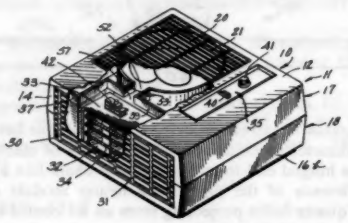
SENSING MEANS FOR ELECTRIC FAN HEATER

Raymond W. Kunz, Monroe, and Albert E. Schulz, Fairfield, both of Conn., assignors to General Electric Company, Bridgeport, Conn.

Filed June 21, 1971, Ser. No. 154,778

Int. Cl. H05b 1/02; F24h 3/04

U.S. Cl. 219—363 **5 Claims**



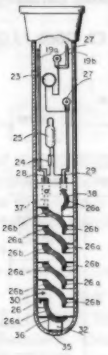
An electric fan heater of the space heating type includes a housing having an air inlet opening in the top wall and an air outlet opening in the front wall with an electric heating element in close proximity thereto. A motor driven axial flow fan having a vertical axis of rotation is utilized to provide an air flow through said housing between said inlet and outlet openings. A temperature responsive safety switch is located above the heating element and is positioned in an air flow passage having one end in air flow communication with the air outlet and its other end in air flow communication with the air outlet and its other end in air flow communication with the inlet side of the fan whereby heated air is allowed to flow back to the fan over the safety switch in the event of an obstruction

at the outlet opening. In one embodiment a shielding member is provided between the air inlet opening and the fan to partially block the inlet opening. The shielding member is positioned above the fan adjacent the centrifugal air stream path toward the front wall and overlies the air passage.

3,731,058
AQUARIUM HEATER

Eugene Bleiweiss, Maywood, N.J., assignor to Metaframe Corporation, Maywood, N.J.

Filed Jan. 20, 1971, Ser. No. 108,030
Int. Cl. H05b *3/80*; H01c *1/02*
U.S. Cl. 219—523 **5 Claims**



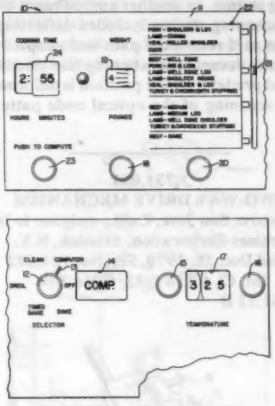
A heating coil in an aquarium heater housing which comprises an electrically insulative support member, being helically enwrapped the support member helically with an electric heating element, the helically enwrapped support member being disposed in an aquarium heater housing, and the entire helically arranged heating element being maintained in spaced relation with the interior of the aquarium heater housing. The support member is provided with a plurality of longitudinally spaced transverse limbs which act to define a plurality of longitudinally spaced slots. The heating element is helically seated entirely within the slots so that it and the heater housing are maintained in spaced relation by the transverse limbs contacting the interior of the housing. The support member is also provided with a longitudinally extending limb engaging a closed end of the housing for maintaining the heating element and the housing in longitudinally spaced relation.

3,731,059
COOKING COMPUTER

James R. Willson, Garden Grove, Calif., assignor to Robertshaw Controls Company, Richmond, Va.

Continuation-in-part of Ser. No. 47,345, June 18, 1970, abandoned. This application Feb. 1, 1971, Ser. No. 111,727
Int. Cl. G06c *29/00*
U.S. Cl. 235—61 A **14 Claims**

A computer-controller device for controlling the cooking operation of a cooking apparatus, the device having a weight input means for setting the device at a weight setting corresponding to the weight of a meat item to be cooked by the apparatus. The device has a meat doneness input means for setting the device at a doneness setting for a particular meat item. The device has means operatively associated with the input means to cause the cooking apparatus to cook the meat item at a predetermined and substantially constant cooking temperature for a period of time computed in accordance with a cooking time formula based on at least the weight setting of the device and for causing a subsequent reduction in the cooking temperature at a particular point in the time period as computed in accordance with the doneness setting of the device whereby the meat item will be substantially at the

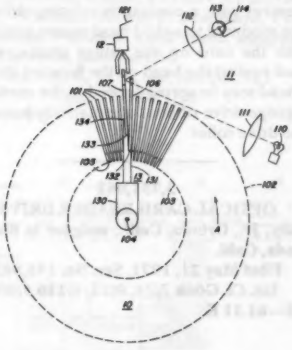


doneness of the doneness setting at the termination of the computed cooking time period.

3,731,060
DOCUMENT STORAGE AND RETRIEVAL SYSTEM

Hillel Weinstein, Haifa, Israel, assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 17, 1971, Ser. No. 172,496
Int. Cl. G06k *7/10*; G11b *25/04*; B01d *23/24*
U.S. Cl. 235—61.7 R **18 Claims**



A document storage and retrieval system is disclosed in accordance with the teachings of the present invention wherein a plurality of documents are arranged in rotating drum configuration such that each said document rotates through an optical scanning station. The optical scanning station includes optical scanning means for scanning an identifying optical code pattern recorded on a document when said document rotates into a predetermined position. An electrical representation of the scanned optical code pattern is compared with a predetermined electrical signal representative of a selected one of said document or group of said documents, and if said electrical representation corresponds to said predetermined electrical signal the scanned document is removed from said drum configuration. The document storage and retrieval system has the capability of retrieving a single stored document or a group of stored documents. In one embodiment of the present invention, the scanning station operates in a cooperating manner with reciprocating support means adapted to be interposed in the rotational path of the documents whereby a document that is rotated into said predeter-

mined position is displaced from the drum configuration and supported by said reciprocating support means such that the optical code pattern on said document is optimally positioned at said scanning station. In another embodiment of the present invention the scanning station includes deflecting means fixedly disposed in said rotational path and adapted for slidable contact with said documents whereby the document that is rotated into said predetermined position is deformed to enable the successive scanning of the optical code patterns on each document.

3,731,061

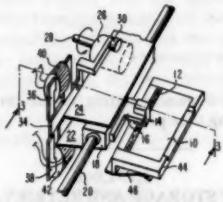
TWO-WAY DRIVE MECHANISM

Robert J. Laybourn, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 28, 1970, Ser. No. 101,682

Int. Cl. G11b *5/52*; **G06r** *7/08*

U.S. Cl. 235—61.11 D **1 Claim**



A drive mechanism for causing, for example, a magnetic read head to scan a magnetic track on an identification card. The head is mounted to a carriage which is driven in a forward or reverse direction along a guide rod by bringing one of two feeler gauge drive ribbons fixedly attached to said carriage into engagement with a constantly rotating drive wheel. The head may be mounted to a rigid head mount and rotated out of contact with the card on the return stroke, with the card spring-biased against the head on the forward stroke. Alternatively, the head may be spring-loaded to the carriage with flexible feeler gauge drive ribbons alternatively brought into contact with the drive roller.

3,731,062

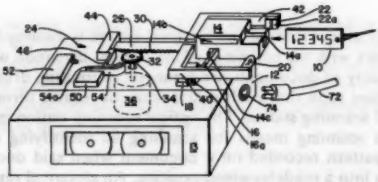
OPTICAL CARD READER DRIVE

John J. Reilly, Jr., Orinda, Calif., assignor to Binary Systems, Inc., Orinda, Calif.

Filed May 21, 1971, Ser. No. 145,983

Int. Cl. G06k *7/14, 9/13*; **G11b** *5/00*

U.S. Cl. 235—61.11 E **1 Claim**



A card reader for optically scanning a field of machine-sensible numeric information imprinted on an identifying tag or card attached to an article of merchandise and generating therefrom electronic signals representative of the information. The card is translucent and the imprinting material is opaque with respect to illumination directed against the surface of the card from a light source on one side thereof. Photodetecting means are positioned in light receiving alignment with the light source on the opposite side of the card to record the presence of light passing through the blank areas of the card and the absence of light blocked by the imprinted areas. The photodetector output is connected to a suitable electronic signal generating circuit. Means are provided to move the aligned light source and photodetector unit along the card to scan across the machine readable data field and to return them to their initial position with respect to the card after the scan is completed.

3,731,063

METHOD AND ARRANGEMENT FOR POSITIONING OF A SELECTED IMAGE IN A SEQUENCE OF IMAGES AT A PREDETERMINED LOCATION

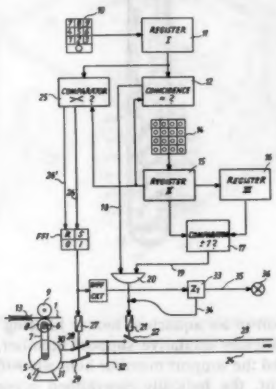
Horst Bickl, Pullach, and Josef Pfeifer, Unterhaching, both of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 4, 1971, Ser. No. 168,836

Claims priority, application Germany, Aug. 6, 1970, P 20 39 208.9

Int. Cl. G06k *13/20*

U.S. Cl. 235—61.11 E **18 Claims**



Microfilm is transported past a read-out station. Each of the frame of the microfilm has a code markings in a cyclic progressive code. An optical read head furnishes code marking signals corresponding to the code marking of the frame at the microfilm read-out station. A keyboard furnishes an input signal signifying a selected frame. A first comparator compares the input signal to the code marking signal and furnishes a first coincidence signal when the two are equal. The first comparator further furnishes a comparator signal determining the direction of transport of the film in dependence on the sign of the difference between the code marking signal and the input signal. A second comparator compares each code marking signal with the last previously read code marking signal and furnishes a second coincidence signal when a unit step is indicated by said comparison. The film transport is stopped upon simultaneous presence of the first and second coincidence signals.

3,731,064

DATA PROCESSING SYSTEM AND READER THEREFOR

Robert M. Berler, Westport, Conn.; Norman Alpert, Scarsdale, N.Y., and Nanjundiah N. Murthy, West Redding, Conn., assignors to Pitney Bowes-Alpex, Inc.

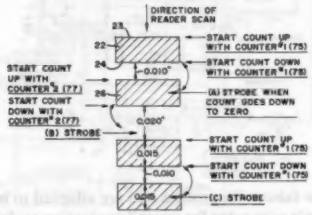
Filed July 28, 1970, Ser. No. 58,762

Int. Cl. G06k *7/10*

U.S. Cl. 235—61.11 E **19 Claims**

A novel data processing means is provided comprising a technique for scanning a coded document in which the code appears as a row of printed lines of substantially equal length. The spaces between the individual lines in the row are of predetermined widths. These lines, in combination with the associated spaces of different widths constitute, for example, a binary code that is registered through a photosensitive system,

i.e. a handheld reader which is drawn along the length of the document. The reader is characterized by its simplicity and absence of any moving parts; it has an extremely broad tolerance and produces a valid readout so long as it scans, i.e. crosses, any part of the line. Orientation of the reader during its scan stroke is immaterial; it may be held on any side. The reader has an area spot resolution which is no greater than the width of the thinnest space in the code grouping. Command signals, and logic circuits determine the character of the encoded digit under observation through the reader which has a


DIRECTION OF READER SCAN
START COUNT UP WITH COUNTER #1 (75)
START COUNT DOWN WITH COUNTER #1 (75)
START COUNT UP WITH COUNTER #2 (77)
START COUNT DOWN WITH COUNTER #2 (77)
(A) STROBE WHEN COUNT GOES DOWN TO ZERO
(B) STROBE
(C) STROBE

self-contained source of illumination for the lines and spaces on the document. In response to line activation, the logic system displays a degree of self-learning that enables it to adjust to varying scan speeds and nevertheless decode the array with great accuracy.

3,731,065

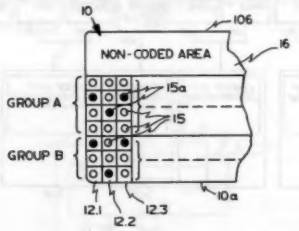
CODED DOCUMENT

Fredric E. Zucker, Stamford, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Oct. 8, 1970, Ser. No. 79,193

Int. Cl. G06k *7/12, 19/06;* **H04q** *9/14;* **H04m** *17/02*

U.S. Cl. 235—61.12 N **1 Claim**



A Touch-tone coded credit card employing first and second code groups, the first group having four bit positions and the second group three bit positions, one of which is utilized in each group to identify a decimal digit. The card is provided with a non-coded area (used for a magnetic or signature stripe) which is positioned opposite the first code group, and is at least as wide. If the card is reversed side-to-side when positioned in a code reader, no output is derived from the first code group because the reader scans the non-coded area. This fact can be employed to prevent faulty operation of the card reading system.

3,731,066

FORWARD AND BACKWARD ROLLER COUNTER ESPECIALLY WITH PRESELECTOR MEANS

Wilhelm Menke, 6530 Bingen, Germany, assignor to NSM Apparatebau GmbH, Bingen/Rhein, Germany

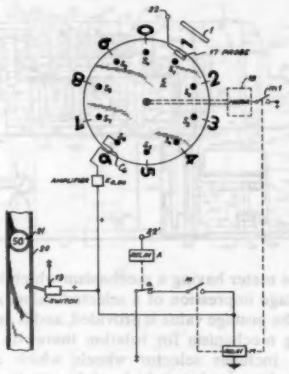
Filed Aug. 26, 1971, Ser. No. 175,104

Claims priority, application Germany, Sept. 2, 1970, P 20 43 501.2

Int. Cl. G06m *3/08*

U.S. Cl. 235—92 CN **10 Claims**

The present roller or register counter has a read-out window and is useful in coin operated devices such as slot machines, vending machines, and especially in automatic gaming devices for adding and subtracting amounts by means of forwardly and reversely rotating rollers or registers driven through the register for indicating the lowest credit. A memory member is provided for each position of the lowest credit register. A pick-up device is located at said read-out window. Storing sta-



tions are arranged at predetermined steps remote from said window for inserting values in the respective memory member in response to coins inserted into the apparatus.

3,731,067

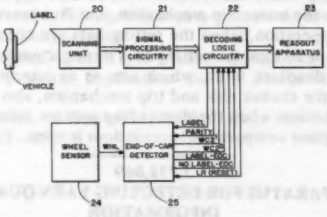
MONITORING APPARATUS FOR DETECTING THE PASSAGE OF OBJECTS PAST A POINT

Garo Arevian, Whitman; Wilson P. Boothroyd, Carlisle, and Elton E. Dunbar, Waltham, all of Mass., assignors to GTE Information Systems, Incorporated

Filed Aug. 6, 1971, Ser. No. 169,762

Int. Cl. B61l *1/16*

U.S. Cl. 235—92 FQ **15 Claims**



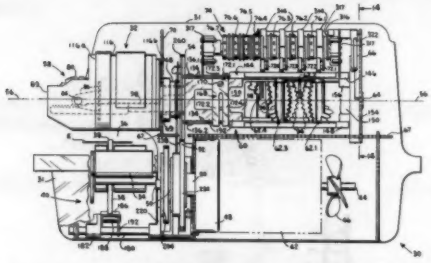
Apparatus for use with coded-vehicle identification systems for detecting the passage of the ends of railroad cars past a detection point. The apparatus determines the time interval between passage of adjacent wheels of each truck of a car past the detection point, and indicates that a truck has completely passed the detection point when a period of time equal to 1.6 times the time interval between passage of the last two wheels has elapsed without detection of another wheel. An end-of-car signal is produced at a time after the last wheel of the second truck has passed the detection point equal to 1.6 times the timer interval between passage of the last two wheels of the second truck. For the majority of railroad cars of the flat car type used in "piggyback" operations this end-of-car signal occurs as the region of the coupler passes the detection point. The apparatus also provides appropriate end-of-car signals for certain less common car configurations, and also includes arrangements for maintaining the apparatus in synchronism with the cars of a train by checking the occurrence of the coded labels on the cars.

3,731,068

VALUE DISPENSING MECHANISMS

Walter J. Hanson, Old Greenwich, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Nov. 23, 1970, Ser. No. 91,800
Int. Cl. G07g *1/00;* **G06f** *15/18*
U.S. Cl. 235—101 **30 Claims**



A postage meter having a mechanism which is rotatable to print a postage impression of a selected value. A mechanism for setting the postage value is provided, and is assembled with the printing mechanism for rotation therewith. This setting mechanism includes selector wheels which are coaxially rotatable, and setting bars which are longitudinally translatable in response to rotation of the selector wheels. Economic accountability is assured by postage registers having four drivable decimal orders, and input pinions for each such order. The setting mechanism has four adjustable register-driving gear clusters which are normally disengaged from the register pinions, but engage them during printing. Mechanisms are provided for choking the register, and for clamping the choke devices to provide positive register locking when the driving gear clusters are disengaged from the pinions. The setting bars comprise an assembly of individual bar members, pairs of which are connected together for joint translation. The bars are nested in a unique way, and are formed with respective gear tooth racks which adjust the register-driving gear clusters and set the numerical value of the postage printing wheels. Rectification is accomplished by pawls which engage the setting bar racks, and have a mutually interlocking relationship with a shutter disk. This interlock operates either to disable the meter trip mechanism, and thus prevent postage printing operation, when the setting bars are not in rectified position; or to lock the setting bars during a postage printing cycle. A deadlock latch, which acts as an intermediate link between the shutter disk and trip mechanism, also blocks the trip mechanism when the descending postage balance is low, or the register compartment access door is open.

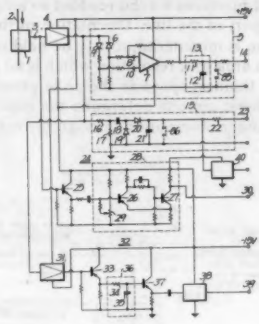
3,731,069

APPARATUS FOR DETECTING YARN QUALITY INFORMATION

Tsugio Goto, and Tsutomu Tamura, both of Nobeoka, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaiska, Osaka, Japan

Filed Aug. 27, 1971, Ser. No. 175,485
Claims priority, application Japan, Aug. 29, 1970, 45/75757; Nov. 4, 1970, 45/97368; Nov. 4, 1970, 45/97369; Feb. 3, 1971, 46/3908; Feb. 1, 1971, 46/3909
Int. Cl. G06g *7/66*
U.S. Cl. 235—151.3 **18 Claims**

Yarn evenness or nonuniformity in thickness or mass of filamentary or film-shaped yarns formed of synthetic polymers, natural or regenerated celluloses or the like is detected in the form of electrical deviation signals, which are applied first to an areal average detector circuit to provide an areal average, lengthwise of the yarn, of irregularities, secondly to a peak value detector circuit to provide an average of crest values lengthwise of the yarn of the irregularities, and thirdly to an abnormality detector circuit to detect abnormally thick yarn portions such as fluff or slub which occur isolatedly or to detect filament abnormalities in a multi-filament yarn which also occur isolatedly. These detected outputs are derived from a running yarn or yarns travelling through a yarn production,



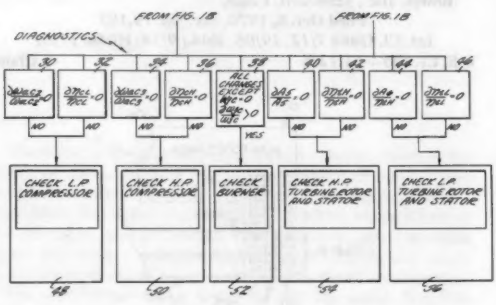
finishing or false twist process and are adapted to be utilized in an electronic computer for overall evaluation to determine the yarn quality.

3,731,070

GAS TURBINE ENGINE ANALYZER

Louis A. Urban, Granby, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed April 27, 1971, Ser. No. 137,924
Int. Cl. G06f *15/20, 15/32*
U.S. Cl. 235—151.3 **11 Claims**



The relative health of a gas turbine engine is analyzed and the particular faults are automatically determined by sensing monitored parameters of the gas path of gas turbine engine and electronically computing them into thermodynamically independent variables and comparing the rate of change of this value with a base line value used as a reference datum. A special purpose computer is programmed to include a general influence coefficient matrix containing the independent variables selected to determine the specific fault and serves to thermodynamically simulate the engine's operations.

3,731,071

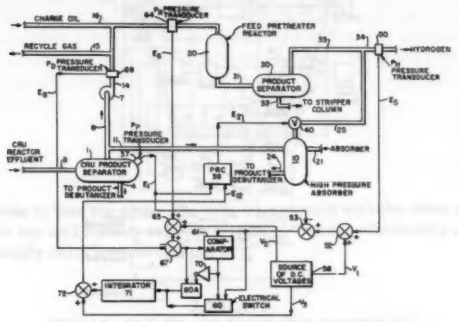
MINIMUM OPERATING PRESSURE CONTROL SYSTEM AND METHOD FOR CONTROLLING A PRODUCT SEPARATOR IN A CATALYTIC REFORMING UNIT

William D. White, Nederland, and Walker L. Hopkins, Groves, both of Tex., assignors to Texaco Inc., New York, N.Y.

Filed June 3, 1971, Ser. No. 149,596
Int. Cl. G06g *7/58;* **C10g** *35/04*
U.S. Cl. 235—151.12 **10 Claims**

A control system for maintaining the operating pressure of a product separator in a catalytic reforming unit at a minimum value so as to provide economical operation. The gas output from the product separator follows two distinct paths: one

path includes a charge oil pretreating unit which provides hydrogen from the gas, the other path includes a high pressure absorber which also provides hydrogen from the gas. The pressure necessary at the product separator to provide steady flow in a path is determined for each each path in accordance



with equations hereinafter described in detail. The pressures in the paths are sensed and corresponding signals provided. A network determines constraint pressures for the product separator and selects the greater constraint pressure. The control system maintains the product separator at that pressure.

3,731,072

SIGNAL PROCESSING CIRCUITS

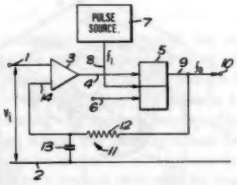
James Stewart Johnston, Sussex, England, assignor to Rosemount Engineering Company, Limited, Bagnor Regis, Sussex, England

Filed July 22, 1971, Ser. No. 165,198

Claims priority, application Great Britain, Sept. 22, 1970, 45,143/70

Int. Cl. H03k *13/02*

U.S. Cl. 235—151.3 **16 Claims**



A signal processing circuit comprises a difference amplifier receiving an input signal and a feedback signal. A bistable circuit switches repeatedly between states only when the difference amplifier's output is non-zero and positive. The feedback signal is developed by a switch that is closed to apply to an integrator a reference signal in response to pulses from the output of the bistable circuit. A source providing a pulse train clocks the bistable circuit. A heat meter in which the input signal comes from a temperature sensitive bridge and the pulse train comes from a flow meter is described.

3,731,073

PROGRAMMABLE SWITCHING ARRAY

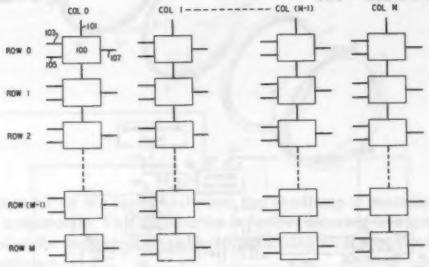
Philip John Moylan, Holmdel, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

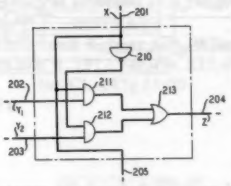
Filed April 5, 1972, Ser. No. 241,267

Int. Cl. H03k *19/20*

U.S. Cl. 235—152 **10 Claims**

A method and apparatus are disclosed for programming a fixed array of identical logic modules to generate an arbitrary combinational switching function. In particular, an array is provided which includes an ordered arrangement of columns of modules, each module having a plurality of input leads and at least one output lead. By completing electrical paths between the output leads of selected ones of the modules in a





given column with the inputs of modules in the adjacent column, the array is tailored to produce the desired function. The connections are specified by an interconnection algorithm which is based on factors of the desired switching function and which is chosen to eliminate crossovers among the connecting paths.

3,731,074

DECIMAL-BINARY CODE CONVERSION SYSTEM

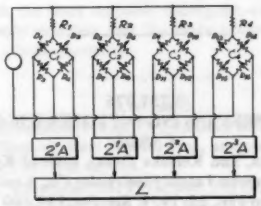
Noboru Masuda, Kawaguchi, Japan, assignor to Denki Onkyo Co., Ltd., Tokyo, Japan

Filed March 12, 1971, Ser. No. 123,748

Claims priority, application Japan, March 12, 1970, 45/21013

Int. Cl. G06f *5/02*; **H03k** *13/24*, *13/247*

U.S. Cl. 235—155 **6 Claims**



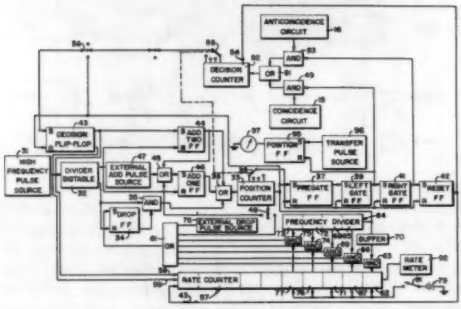
A decimal-binary code conversion system wherein four amplifying circuits are formed by respectively connecting four magnetro-resistance effect devices formed as a bridge circuit to each of four amplifiers which produce different output signals, four different numerical values being binary-coded with independent operation of four amplifying circuits, and six numerical values being binary-coded with composite operations of the two of four amplifying circuits.

3,731,075

AUTOMATIC RATE TRACKER

John C. Munson, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy

Filed June 29, 1962, Ser. No. 206,526
Int. Cl. G06f *15/34*
U.S. Cl. 235—181 **8 Claims**



7. In a signal position determining means for determining the exact position of the maximum correlation in a correlation function signal cycle obtained from a correlation circuit for comparing equally spaced pulses indicative of polarity samples of two different input waveforms, said correlation circuit producing a coincidence or a non-coincidence pulse for each comparison, decision circuit comprising gate timing means for generating a pair of gate intervals of equal time duration on either side of the approximate position of maximum correlation, coincidence gate means connected to said timing means for passing a coincidence pulse therethrough for each polarity coincidence occurring during one of said gate intervals, anti-coincidence gate means connected to said timing means for passing a non-coincidence pulse therethrough for each polarity non-coincidence occurring during the other of said gate intervals, decision counter means being connected to said first and second gate means to count the pulses passed through both said gates, whereby the number of pulses counted by said counter means during said first and second gate intervals is indicative of the position of said gate intervals with relation to said maximum correlation position.

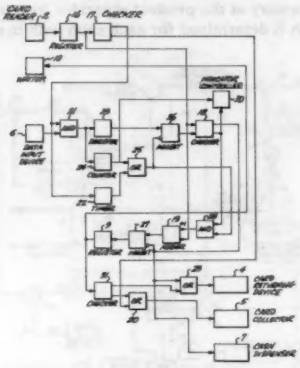
3,731,076

SYSTEM FOR PREVENTING IMPROPER USE OF CREDIT CARDS

Masanori Nagata, and Keisuke Osaki, both of Kyoto, Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Feb. 25, 1971, Ser. No. 118,600
Claims priority, application Japan, March 3, 1970, 45/18496
Int. Cl. G06f *7/04*; H04q *3/02*
U.S. Cl. 235—61.7 B **14 Claims**

A system for preventing improper use of credit cards having necessary data recorded thereon in card-actuated machines, wherein the system checks for a predetermined correspondence between the data read from a card inserted into the machine, and the data manually entered by the user of the card. If a correspondence does not exist, the stored number of times of absence of said correspondence with respect to the



individual card is increased. When the stored number reaches a predetermined number, the card is invalidated.

ERRATUM

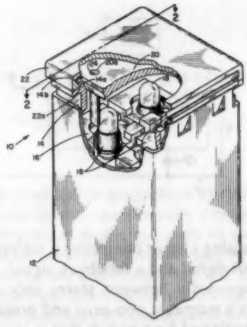
For Class 235—61.11 D see:
Patent No. 3,731,085

3,731,077

ILLUMINATED INDICATOR FOR HIGH AND LOW AMBIENT LIGHT ENVIRONMENTS

Franz S. Reisch, Freeport, Ill., assignor to Honeywell Inc., Minneapolis, Minn.

Filed March 31, 1971, Ser. No. 129,867
Int. Cl. F21
U.S. Cl. 240—1 EL **4 Claims**



An illuminated indicator having two concurrently illuminable portions, one of which provides a diffused signal clearly visible only under low ambient light conditions and the other of which provides a bright concentrated signal clearly visible under high ambient light conditions.

3,731,078

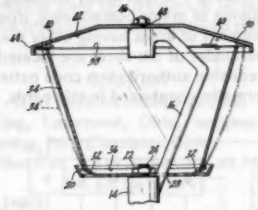
LANTERN

Willard F. Vanderbeek, Sycamore, Ill., assignor to Olin Corporation, New Haven, Conn.

Filed April 30, 1971, Ser. No. 138,961
Int. Cl. F21l *7/00*
U.S. Cl. 240—11 **4 Claims**

A lantern structure having a transparent or translucent globe member which protects a lantern mantle or flame. Top

and bottom support members are disposed above and below the globe, and spring means are mounted on at least one of the top and bottom support members in engagement with the



globe to bias the globe into snug engagement with the other of the top and bottom support members, thereby eliminating or sharply reducing globe rattle.

3,731,079

SWINGABLE HEADLIGHT FOR VEHICLES

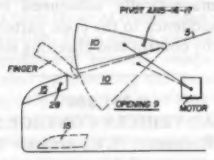
Ferdinand Anton Ernst Porsche, Feuerbacher Weg 48, 7 Stuttgart-Nord, Germany, assignor to Firma Dr-fng. H. C. F. Porsche K. G., Zuffenhausen, Germany

Filed Oct. 27, 1970, Ser. No. 84,418

Claims priority, application Germany, Nov. 8, 1969, P 19 56 346.3

Int. Cl. B60k *27/08*; B60q *1/04*

U.S. Cl. 240—7.1 H **28 Claims**



A headlight mounting arrangement for vehicles utilizing headlights of the type that are pivoted from an in-use position above the surrounding surfaces of the vehicle body to a stored or rest position in an opening in the vehicle body. The structural element forming the forward outwardly facing edge of the opening within which the headlight is to be pivoted into is constructed so as to be movable in response to a force thereon such that the limb of a person that may be inadvertently positioned adjacent the front of the headlight when the headlight is being pivoted into the opening is protected from being squeezed between the headlight and the structural element. The structural element is mounted at the adjoining fixed vehicle body structure by way of yieldable elements in the form of pins. One embodiment of the invention utilizes pins with a constricted portion acting as shear pins, while another embodiment utilizes a two part disengagable pin structure. The structural element is contoured to smoothly blend with the surrounding body structure under normal use.

3,731,080

HEADLAMP POLARIZING ATTACHMENT

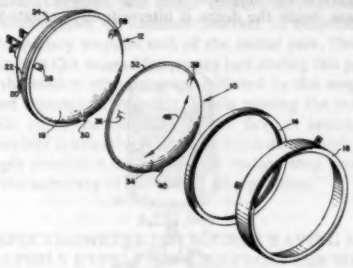
Vaito K. Eloranta, Needham, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed June 28, 1971, Ser. No. 157,145

Int. Cl. F21v *9/14*; G02b *5/30, 27/28*

U.S. Cl. 240—9.5 **21 Claims**

This concept is directed to a headlamp polarizing attachment using a linear polarizer having a spherical shape with asymmetric receptacles formed in it. The attachment fits on a standard automobile headlamp when it is positioned so the receptacles will receive aiming bosses which are an integral part of the headlamp. Positioning the attachment to fit on the headlamp orients the transmission azimuth of the polarizer so



it is at 45° to the horizontal when the headlamp is mounted on an automobile. This application is further directed to a special gasket for sealing the headlamp polarizing attachment to the headlamp.

3,731,081

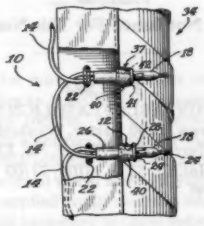
ELECTRICALLY ILLUMINATED ORNAMENTAL DISPLAY

Bernard Yellin, 5252 South Kolmar Ave., Wilmette, Ill.

Filed Feb. 4, 1972, Ser. No. 223,481

Int. Cl. A47g *33/00*

U.S. Cl. 240—10 R **5 Claims**



An electrically illuminated ornamental display comprising a body member of any shape provided with a plurality of spaced body socket openings which are adapted to receive and support a decorative lighting string of lights, which string of lights comprises a plurality of electrical sockets each with a bulb therein, with the electrical sockets connected by electrical conductors to form a string of lights, said body member adapted to receive said string of lights by inserting the electrical sockets from the rear of the body member into said body sockets, with the body member hiding the electrical conductors. The body member and the body sockets are integrally molded of a plastic material.

3,731,082

EMERGENCY WARNING LIGHT APPARATUS

Arnold O. Blaylock, Fort Worth, Tex., assignor to Lectric Lites Company, Fort Worth, Tex.

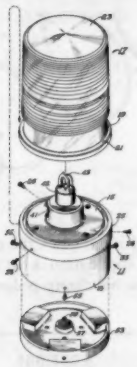
Filed Sept. 30, 1970, Ser. No. 76,662

Int. Cl. B64f *1/20*; F21v *21/00*

U.S. Cl. 240—10.5 **6 Claims**

An emergency warning light apparatus having a high-intensity bulb carried on a base and covered by a translucent, substantially cylindrical dome, one portion of which has the form of a Fresnel, ribbed pattern on a cylindrical wall surface and a conical deflector in its upper portion, with its apex disposed from the base of the cone toward the bulb. The base includes a lower plate adapted for essentially universal mounting, includ-

ing a central aperture that is threaded to receive a support bar, a plurality of smaller apertures clustered around the central aperture, and a plurality of sockets on a lower surface to receive permanent magnets. The high-intensity bulb carried by the base inside the dome is intermitently actuated,being a



strobe light connected with a power transistor of a circuit means, the heat generated by the transistor being conducted to the base by a heat conductive fastener which with the base defines a heat sink to dissipate the heat generated by the power transistor.

3,731,083

Patent Not Issued For This Number

3,731,084

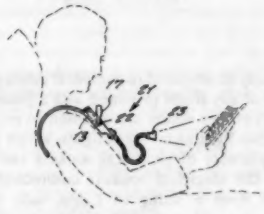
PORTABLE FLASHLIGHT

Blanche P. Trevorrow, 1090 Baxter, Waukesha, Wis.

Filed March 20, 1972, Ser. No. 236,066

Int. Cl. F21v *33/00, 21/00*

U.S. Cl. 240—6.4 W **1 Claim**



A flashlight integral with a harness so it can be supported from the shoulders of a person and child so that their hands are free for other tasks. The device consists of a flashlight unit equipped with an electric lamp and dry cell battery which is attached to a pair of flexible hollow stems each of which is secured to an adjustable shoulderband and a mercury actuated switch pivotally attached to one of the shoulder bands.

3,731,085

CREDIT CARD OR THE LIKE

Sten-Lennart Bostrom, Hagersten, Sweden, assignor to Dasy Inter S.A., Geneva, Switzerland

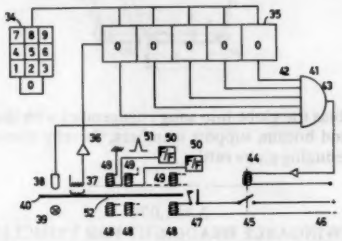
Filed Nov. 5, 1970, Ser. No. 87,254

Claims priority, application Switzerland, Nov. 6, 1969, 15203; Jan. 19, 1970, 577

Int. Cl. G06k *7/08, 19/08*

U.S. Cl. 235—61.11 D **23 Claims**

A system for checking cards serving as identification document and as proof of authorization, said system comprising; a card serving as identification document and as proof of authorization, comprising visual identification information carrying elements, and at least one recording medium carrying invisible information and comprising a thin sheet of non-magnetizable metal, being a magnetically shielding high-permeable alloy, containing as major components, iron and nickel in which sheet a number of areas having other magnetic properties than the remainder of the sheet are located to provide at least one unamendable authorization code pattern, and means for reading information contained in said cards, and means for



checking the information read, and wherein said reading means comprises a slot for inserting said cards, at least one magnetic means located on one side of the inserted card, and magnetically operable means located on the opposite side of said card, the arrangement of at least said magnetically operable means corresponding to all possible code patterns on said sheet, and wherein a number of said magnetically operable means, upon the correct insertion of a card in said slot, are adapted to be magnetically influenced by said magnetic means, in correspondence to the code pattern of said inserted card, and to thereby control said checking means.

3,731,086

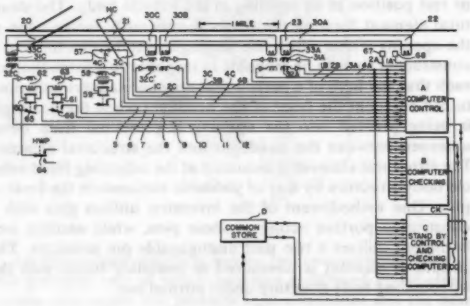
RAILROAD VEHICLE CONTROL SYSTEM

Willis R. Smith, Rochester, N.Y., assignor to General Signal Corporation, Rochester, N.Y.

Continuation of Ser. No. 14,909, Feb. 27, 1970. This application Oct. 15, 1971, Ser. No. 189,731

Int. Cl. B61l *3/18*

U.S. Cl. 246—63 C **7 Claims**



A railroad vehicle control system governed by a wayside computer has a communications channel for each track section in the territory for periodically exchanging information between said computer and said railroad vehicle wherein the improvement comprises a tachometer means governed by the rate of rotation of the wheels of said vehicle for producing pulses indicative of the actual speed in accordance with said rate of rotation. The computer includes a control stage for calculating speed, and generating desired speed control signal pulses for transmission to the vehicle and a checking stage

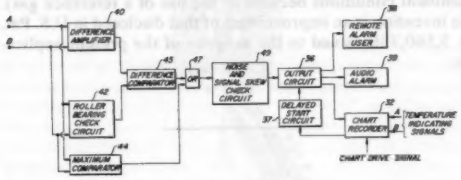
responsive to said control stage for validating the desired speed signal. A standby stage responsive to the control and checking stages assumes control and checking functions upon failure of either of said stages. A comparator responsive to the control and actual speed pulses increases and decreases the speed of the vehicle until the frequency of the actual speed pulses equals the frequency of desired speed pulses.

3,731,087

HOT BOX ALARM SYSTEM

Joseph W. King, Lakewood, Ohio, assignor to Cleveland Technical Center, Inc., Cleveland, Ohio

Filed Nov. 16, 1970, Ser. No. 89,910
Int. Cl. B61l 3/10
U.S. Cl. 246—169D **22 Claims**



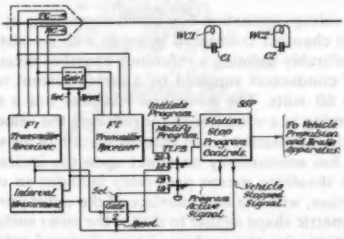
Method and apparatus for evaluating temperature indicating signals from a railway hot box detector and producing an alarm signal therefrom. The signals are differentially evaluated and are compared to appropriate reference signals to detect overheated solid or roller bearings. False alarm signals produced from the differential evaluation because of the difficulty in distinguishing the temperatures of normally operating roller bearings from those of overheated solid bearings are detected and cancelled. False alarm signals caused by noise and by time displacement between temperature indicating signals are cancelled by checking the duration of all alarm signals and passing only those that have long enough durations not to have been produced by noise or by differential evaluation of time displaced temperature indicating signals. The alarm system is advantageously connected in circuit with a chart recorder to produce a permanent record of hot boxes.

3,731,088

STATION STOP CONTROL ARRANGEMENT FOR SELF-PROPELLED VEHICLES

Reed H. Grundy, Murrysville, and Donald R. Little, Greensburg, both of Pa., assignors to Westinghouse Air Brake Company, Swissvale, Pa.

Filed Feb. 17, 1971, Ser. No. 116,033
Int. Cl. B61l 3/06
U.S. Cl. 246—182 B **9 Claims**



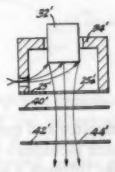
Coils tuned to a first and a second frequency are positioned in pairs along the track in approach to the station at which trains are to stop automatically, two pairs being shown. Othe first pair are spaced a distance which establishes a selected passage time in accordance with average train speeds while the second pair are separated a distance proportional to predetermined differences in train lengths. On the train two transmitter and/or receivers are coupled by a common pair of coils to inductively respond to the corresponding frequency wayside coil. Response to the initial first frequency coil opens a gate which enables the other transmitter-receiver for a predetermined time or distance interval to respond to the second frequency wayside coil of the initial pair. Only if the train coils pass this second frequency coil during this gating interval is the station stop program initiated by the response of the second transmitter-receiver. While passing the second set of wayside coils, the response of the first or second transmitter-receiver is selectively used, in accordance with a preset train length condition, to modify the station stop program to improve the accuracy of the station stop position.

3,731,089

MASS SPECTROMETER ION SOURCE HAVING MEANS FOR RAPIDLY EXPELLING IONS FROM THE SOURCE AND METHOD OF OPERATION

Richard M. Elliott, Sale, England, assignor to Associated Electrical Industries Limited, London, England

Filed April 27, 1970, Ser. No. 32,324
Claims priority, application Great Britain, April 28, 1969, 21,462/69
Int. Cl. H01j 37/08
U.S. Cl. 250—41.9 SB **4 Claims**



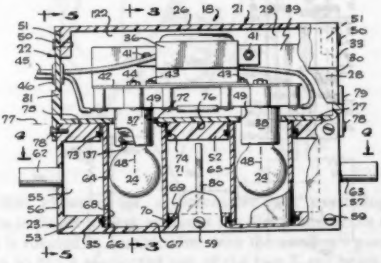
An ion source for mass spectrometers including an ionization chamber having an aperture for the passage of ions and an electrode disposed therein, electron generating means for directing a beam of electrons toward the electrode, means for introducing a sample into the chamber, and source means for developing an electrical signal having a value greater than the value of a signal applied to an electron source and less than the value of a signal necessary to cause substantial field ionization. Also included are circuit means for connecting the source means to the electrode to generate an electrical field about the electrode to rapidly expel ions, developed upon bombardment of the sample by the electrons, through the aperture.

3,731,090

FLUID STERILIZATION

Louis P. Veloz, 500 South Madison Avenue, Pasadena, Calif.

Filed Oct. 30, 1970, Ser. No. 85,648
Int. Cl. H01j 37/00
U.S. Cl. 250—43 **18 Claims**



A fluid sterilizer for an aquarium or the like, including an upper body section adapted to be suspended on an upper edge

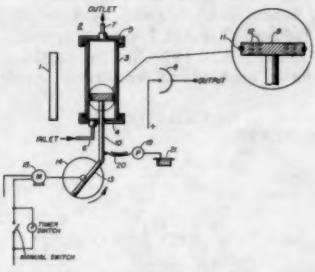
of the aquarium and carrying downwardly projecting ultraviolet lamps, and a lower body section detachably connectible to the upper section and through which water to be sterilized flows, with tubes of ultraviolet passing material being mounted in the lower section to define upwardly opening spaces into which the lamps project when the body structure is assembled.

3,731,091

METHOD AND MEANS FOR MONITORING THE QUANTITY OF DISPERSED OIL IN WATER WITH MEANS FOR WIPING THE SAMPLE CELL

John B. Rosso, and Robert H. Ross, Tulsa, Okla., assignors to Combustion Engineering, Inc., Stamford, Conn.

Filed June 30, 1971, Ser. No. 158,436
Int. Cl. G01n *21/26*
U.S. Cl. 250—43.5 R **2 Claims**



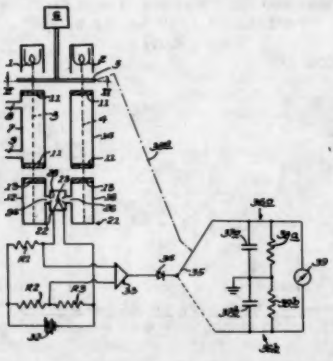
A system is disclosed to monitor and quantify small amounts of oil dispersed in water which includes a source of ultraviolet light for transmission of light through a sample of the dispersion, a chamber for containing the sample of liquid being analyzed, a photocell for translating ultraviolet light transmitted through the sample into an electrical signal, circuit and registration means for compensating and utilizing the signal, and a reciprocating wiper for maintaining the interior walls of the sample chamber in a clean, and therefore in a suitably ultraviolet-transparent, condition.

3,731,092

NON-DISPERSIVE INFRARED GAS ANALYZER HAVING SAMPLE AND REFERENCE BEAMS USING FLOW SENSITIVE DETECTOR AND WITH UNBALANCED OPERATION

Ray S. Freilino, Pittsburgh, Pa., assignor to Mine Safety Appliances Company, Pittsburgh, Pa.

Filed Nov. 11, 1971, Ser. No. 197,899
Int. Cl. G01n *21/34*
U.S. Cl. 250—43.5 R **10 Claims**



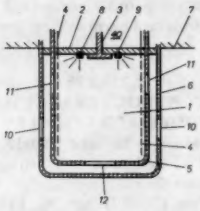
Separate pulsed sample and reference beams of infrared energy are passed, respectively, through sample and reference gases to separate chambers in a detector unit for measuring the absorption of the sample beam by a component of interest in the sample gas. The detector unit includes a flow responsive sensor having a rate of change of resistance that varies inversely with temperature. By cyclically modulating the two beams, as, for example, by a shutter device that in one portion of a cycle cuts off the sample beam but not the reference beam and in another non-consecutive portion of the cycle cuts off the reference beam but not the sample beam and that separates such modulated portions by a cyclical portion in which the infrared energy in both beam paths is substantially equally modulated (including the conditions in which both beams are fully cut off or not cut off at all), one obtains the advantages of unbalanced operation inherent in a single beam instrument (i.e., increased sensitivity due to the non-linear response of the sensor), as well as the advantages of a double beam instrument (i.e., for example, compensation for changes in ambient conditions because of the use of a reference gas). This invention is an improvement of that disclosed in U.S. Pat. No. 3,560,736, issued to the assignee of the present application.

3,731,093

IONIZATION FIRE ALARM WITH WIND SCREEN

Andreas Scheidweiler, Stafa, and Peter R. Muller, See, both of Switzerland, assignors to Cerberus AG, Mannedorf, Switzerland

Continuation-in-part of Ser. No. 834,008, June 17, 1969, abandoned. This application April 5, 1971, Ser. No. 131,106
Claims priority, application Switzerland, June 18, 1968, 9035/68
Int. Cl. G01n *23/12*
U.S. Cl. 250—44 **10 Claims**



A low-voltage ionization fire alarm comprising at least one ionization chamber connected in series with a resistance element, preferably defining a reference chamber means, across a pair of conductors supplied by a direct-current voltage of less than 60 volts. The ionization chamber has a sheathing means serving as a wind screen for reducing the velocity of air flow within the chamber such that circulation of air within the chamber has substantially no effect upon the ionization current. The sheathing means preferably includes an outer and inner portion, with the inner surface of the outer portion having a geometric shape similar to that of the outer surface of the inner portion, the two surfaces being disposed substantially parallel to one another. At least one aperture is provided through the inner and the outer sheathing portions, respectively, the respective apertures being displaced such that the lateral separation between the margins of the aperture in the outer sheathing portion and the aperture in the inner sheathing portion is greater than the separation between the two sheathing portions themselves.

3,731,094

ELECTRON BEAM APPARATUS WITH MEANS FOR GENERATING A ROTATION-SYMMETRICAL MAGNETIC FIELD

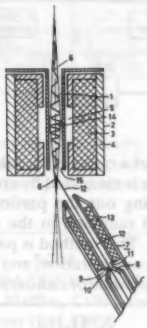
Jan Bart Le Poole, Delft, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 19, 1971, Ser. No. 173,045

Claims priority, application Netherlands, Aug. 21, 1970, 7012387

Int. Cl. H01j 37/26

U.S. Cl. 250—49.5 D 14 Claims



An apparatus for generating an electrostatic space charge in a rotation-symmetrical magnetic field, in which an electron beam from an electron gun which is arranged laterally on the field space generates the space charge in the field space. The electron beam may be adjusted by mechanical adjustment of the gun and also by means of the potential of a conducting sleeve in the magnetic field. By means of this potential, it is also possible to adjust the ratio between the contributions to the space charge which are due to primary electrons and to secondary electrons produced by the primary electrons in a residual gas in the field space.

3,731,095

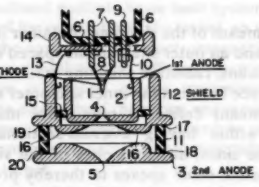
ELECTRON GUN DEVICE OF FIELD EMISSION TYPE

Tsutomu Komoda, Kodaira-shi, Tokyo, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed April 1, 1971, Ser. No. 130,283

Int. Cl. H01j 37/26

U.S. Cl. 250—49.5 A 10 Claims



In an electron gun device of the field emission type, a shield electrode whose potential is the same as that of a cathode-tip of needle shape is disposed in surrounding relationship to a first anode so as to shield said first anode from ground potential portions of the device, such as the envelope, so that discharge between the anode and the ground potential portions is prevented, whereby the needle tip of the cathode is protected from destruction due to said discharge.

3,731,096

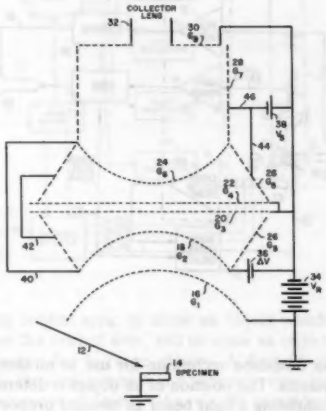
HIGH RESOLUTION, HIGH ETENDUE, RETARDING-POTENTIAL ELECTRON CONCENTRATOR

Forrest L. Carter, Bethesda, Md., assignor to The United States of America as represented by the Secretary of the Navy

Filed Nov. 24, 1971, Ser. No. 201,699

Int. Cl. G01t 1/36

U.S. Cl. 250—49.5 AE 7 Claims



The invention comprises improvements in an electron-concentractor device of the spherical-grid, retarding-potential, post-monochromator spectrometer type. A pair of fine-mesh, high-transparency, spaced, planar grids is added after the first curved coarse focusing grid thereby determining the lower-energy limit of the electron passband. A second oppositely curved coarse focusing grid is added after the planar grids to provide assistance in focusing the passband electrons on the collector lens.

3,731,097

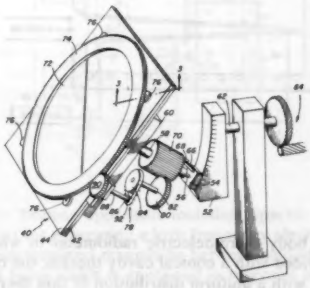
METHOD AND APPARATUS FOR ELIMINATING SPOT DOUBLING IN PRECESSION X-RAY CRYSTALLOGRAPHY

Roy Leander Thomas, Jr., Medway, Mass., assignor to Charles Supper Company, Natick, Mass.

Filed Oct. 7, 1971, Ser. No. 187,353

Int. Cl. G01n 23/20

U.S. Cl. 250—51.5 5 Claims



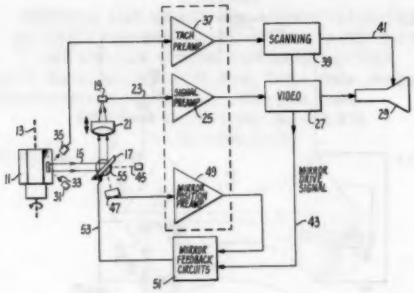
A film cassette for a precession-type crystallographic camera includes a mask adjacent the film plane of the camera which is rotated in synchronism with the camera's precession motion to block a selected one of the two X-ray beam reflections produced for each reciprocal lattice point during a precessive cycle of the camera. A novel method of precession photography is disclosed.

3,731,098

IMAGE SCANNER DRIVE SYSTEM

Robert P. Hunt, Menlo Park, Calif., assignor to Spectrotherm Corp., Mountain View, Calif.

Filed March 6, 1972, Ser. No. 232,036
Int. Cl. H04n 3/16
U.S. Cl. 250—83.3 H **17 Claims**



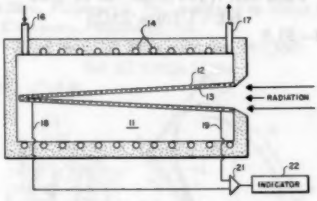
A position detection technique for use in motion control feedback systems. The position of an object is determined by optically modulating a light beam an amount proportional to the position of the object. The degree of optical modulation is then detected by a detector not mechanically connected with the object. A position signal developed by the detector is used in an electronic feedback circuit to accurately control the position of the object. An improved operational amplifier circuit for supplying an object driving motor is disclosed along with an improved delay circuit for controlling object motion.

3,731,099

BLACK BODY THERMOELECTRIC RADIOMETER

Norman D. Greene, Route 1, Box 148, Del Mar, Calif.

Filed Sept. 30, 1970, Ser. No. 76,756
Int. Cl. G01t 1/16
U.S. Cl. 250—83.3 H **1 Claim**



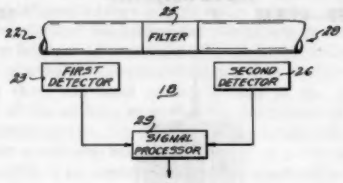
A black body thermoelectric radiometer in which a heat sink is provided with a conical cavity therein; the cavity walls being lined with a uniform distribution of thin thermoelectric heat flux sensors which directly transduce radiation intensity impinging thereon to an electrical voltage having an amplitude proportional to radiation intensity; the radiation being transferred to heat energy and passing through the thermoelectric heat flux sensors into the surrounding heat sink and an insulative layer surrounding the heat sink; the insulative layer carrying cooling coils therein in heat exchange relationship with the heat sink.

3,731,100

MONITOR OF THE CONCENTRATION OF RADIOACTIVE IODINE IN A STREAM OF GAS

Kenneth R. Lattin, Richland, Wash., assignor to The United States of America as represented by the United States Atomic Energy Commission

Filed April 7, 1971, Ser. No. 131,970
Int. Cl. G01t 7/04
U.S. Cl. 250—83.6 FT **4 Claims**



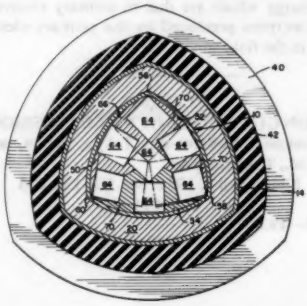
The concentration of a radioactive substance in the effluent from a nuclear reactor is measured by counting total radiation in the effluent, filtering out the particular radioactive substance, counting total radiation in the filtered effluent, and combining the results. This method is particularly sensitive to rapid changes in the concentration, and is especially adapted to the monitoring of amounts of radioactive iodine.

3,731,101

SHIPPING CONTAINER FOR RADIOACTIVE MATERIAL

Reuben W. Peterson, Wilmington, Del.; Harold A. Backus, Wynwood, Pa., and Clifford J. Anderson, Buckeystown, Md., assignors to N L Industries, Inc., New York, N.Y.

Filed April 14, 1971, Ser. No. 133,966
Int. Cl. G21f 5/00
U.S. Cl. 250—108 R **18 Claims**



The body means of the shipping container includes an inner shell means and an outer shell means spaced outwardly of the inner shell means, radiation shielding material being disposed within the space between the inner and outer shell means. The inner shell means defines a radioactive material receiving cavity therewithin having a cross-sectional configuration defining three sides, adjacent ones of the sides joining one another to define three apexes to thereby provide maximum capacity with a minimum size and weight container.

3,731,102

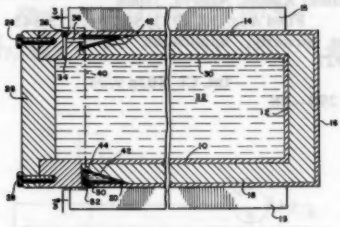
SHIPPING CONTAINER FOR RADIOACTIVE MATERIAL

Reuben W. Peterson, Wilmington, Del., assignor to NL Industries, Inc., New York, N.Y.

Filed May 24, 1971, Ser. No. 146,355
Int. Cl. G21f 5/00
U.S. Cl. 250—108 R **5 Claims**

A body means includes inner and outer shell means having radiation shielding means therebetween and including a

radioactive material receiving central cavity which is filled with liquid coolant during shipment. Expansion means in the form of an annular tank is disposed in a void defined between the shielding means and the outer shell means, this tank



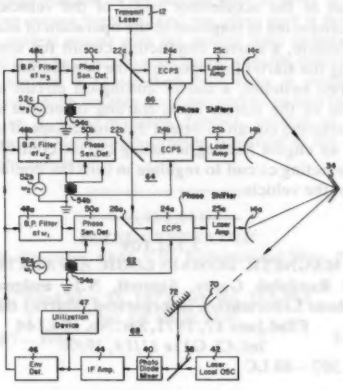
receiving liquid coolant from the cavity when the coolant expands upon an increase in temperature thereof and returning coolant to the central cavity when the coolant contracts upon a decrease in temperature.

3,731,103

ADAPTIVE ARRAYS

Thomas R. O'Meara, Malibu, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Feb. 24, 1971, Ser. No. 128,628
Int. Cl. H04b 9/00
U.S. Cl. 250—199 **7 Claims**



Herein are disclosed multiple beam laser systems with adaptive phase control for establishing, at a target, an in-phase condition between the corresponding electromagnetic fields of all the beams. Phase modulation at different frequencies or differing waveforms is applied in the transmission paths of selected radiating elements of the array; and modulation components in the received energy are utilized to control phase shifters in the transmission paths so as to maintain the cophase condition at the target.

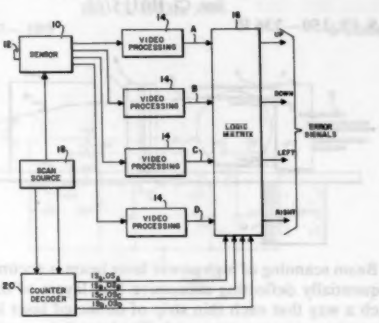
3,731,104

BI-ADAPTIVE SCAN DIGITAL UNIVERSAL SENSOR TARGET TRACKER

Barry S. Todd, Norco, and Werner G. Hueber, China Lake, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy

Filed Jan. 4, 1971, Ser. No. 103,904
Int. Cl. G01s 9/64
U.S. Cl. 250—203 **1 Claim**

Two or more concentric scan boundries are used to track small or large objects. A sensor which has multiple detectors, or a detector with multiple readout signals displaced spatially so as to cover the area of concern with overlapping scans is used for scanning. The central area bounded by the scans is used to sense minor variations in relative object movement. The outer bounded area is used to sense large variations which



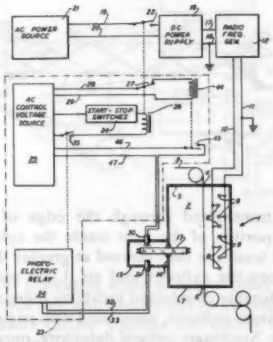
escape the central area, to sense an object which is initially larger than the central area, and to sense an object which has become larger due to range closure. A digital logic circuit is coupled to the sensor output and generates error signals based on the occurence of object video signals coincident with scan derived timing signals.

3,731,105

ARC SUPPRESSOR FOR DIELECTRIC APPARATUS

Mark Preston New Ipswich, N.H., assignor to Litton Business Systems, Inc., New York, N.Y.

Continuation of Ser. No. 29,959, April 20, 1970, abandoned.
This application May 19, 1972, Ser. No. 255,297
Int. Cl. H05b 9/06
U.S. Cl. 250—217 R **3 Claims**

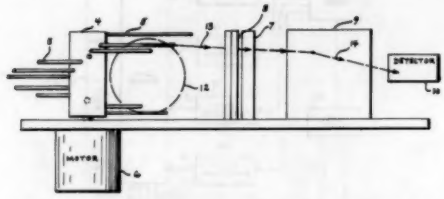


Dielectric heating apparatus including spaced electrodes, power means for generating a high frequency electromagnetic field of predetermined magnitude between said electrodes, a fluorescent lamp which is energized in response to said electromagnetic field when at said predetermined magnitude, means responsive to de-energization of said fluorescent lamp for inhibiting operation of power means whereby, upon an arc being instituted between said electrodes, said electromagnetic field is reduced in magnitude, said fluorescent lamp is de-energized, said power means is interrupted and the arc is suppressed thereby avoiding the danger of fire and thereby preventing damage to both the electrodes and material being heated.

3,731,106
BEAM SCANNER FOR HIGH POWER LASER

Dennis N. Mansell, Palos Verdes Peninsula, Calif., assignor to The United States of America as represented by the Secretary of the Air Force

Filed Nov. 16, 1971, Ser. No. 199,185
Int. Cl. H01j 5/16
U.S. Cl. 250—236 R 2 Claims

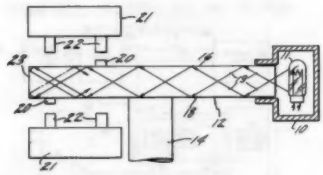


Beam scanning of high power laser beam is accomplished by sequentially deflecting successive thin layers of the beam in such a way that each thin strip of deflected laser light passes across a narrow aperture mask. The laser light passing through the aperture is effectively a scan of that layer of the laser beam. It is subsequently focused onto an appropriate laser beam detector. A spiral arrangement of radial reflector rods mounted on a rotatable drum support structure is used to achieve sequential deflection of successive layers of the laser beam.

3,731,107
OPTICAL SHAFT ENCODER

Raymond W. Goodwin, Westport, and James J. Allmena, Fairfield, both of , Conn., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed Dec. 15, 1971, Ser. No. 208,348
Int. Cl. G01d 5/34
U.S. Cl. 250—231 SE 3 Claims



Light is transmitted through the edge of a transparent cylinder, a portion of the light inside the cylinder being incident to at least one face thereof at greater than the critical angle between the cylinder and air. Light escapes from the faces at a plurality of selected locations thereon in a plurality of unique output patterns, associated with angular positions of the cylinder. Stationary optical detectors, opposite the faces, detect the escaping light when the cylinder is rotated to a position that places a selected location opposite an optical detector. The optical detectors provide signals representative of a unique pattern and hence the angular position of the cylinder.

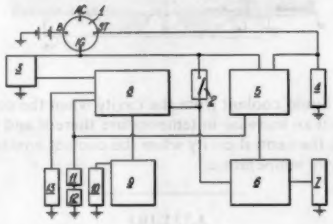
In one embodiment a material having an index of refraction intermediate to that of the cylinder and air is disposed at the selected locations, providing a critical angle greater than the critical angle between the cylinder and the environment, thereby causing light to escape through the faces only at the selected locations.

In another embodiment, notches in the faces of the cylinder are disposed at the selected locations, the notches being at an angle so that light is incident thereto at an angle less than the critical angle, thereby causing light to escape through the faces only at the selected locations.

3,731,108
ENGINE AUTOMATIC CONTROL SYSTEM AND METHOD FOR VEHICLES

Kiyoshi Kobara; Tsutomu Fukuzawa, and Yuzuru Uzihara, all of Tokyo, Japan, assignors to Toyoto Jidosha Hanbai Kabushiki Kaisha, Nagoya, Japan

Filed Aug. 30, 1971, Ser. No. 175,843
Claims priority, application Japan, Dec. 25, 1970, 45/126927
Int. Cl. H02p 9/04
U.S. Cl. 290—38 10 Claims

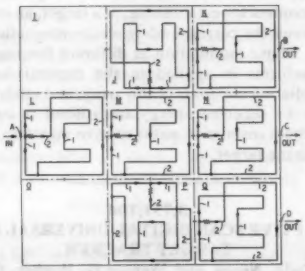


An engine automatic control system for a vehicle having an ignition switch for selectively connecting an electric source with an engine starter and an ignition circuit is provided which comprises an accelerator switch conducted in response to the operation of the accelerator pedal of the vehicle, a clutch switch conducted in response to the operation of clutch means of the vehicle, a starter conducting circuit for automatically operating the starter in response to the conduction of the mentioned two switches, a starter cutting-off circuit to stop the operation of the starter upon starting of engine rotation, a speed detecting circuit to detect the running speed of the vehicle and an engine holding/arresting circuit controlled by the speed detecting circuit to regulate in turn the operation of the engine of the vehicle.

3,731,109
MAGNETIC DOMAIN LOGIC APPARATUS

Michael Randolph Garey, Summit, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 17, 1971, Ser. No. 154,144
Int. Cl. G11c 11/14, 19/00
U.S. Cl. 307—88 LC 28 Claims

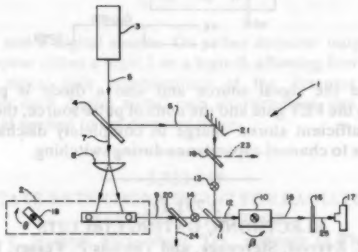


Magnetic domain logic cells for performing a wide variety of elementary logic operations are described. The cells are arranged so that any number can be compatibly interconnected to perform any logical functions realizable with conventional logic circuit devices.

3,731,110
LASER SYSTEM FOR PRODUCING WAVELENGTH-TUNABLE OPTICAL RADIATION

Clarence Forbes Dewey, Jr., Belmont, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed July 12, 1971, Ser. No. 161,906
Int. Cl. H01s 3/10
U.S. Cl. 307—88.3 29 Claims

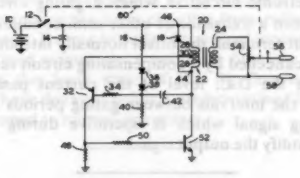


A laser system for providing monochromatic optical radiation, the wavelength of which is tunable. The system employs two lasers, at least one of which is tunable, and one of which is a source of pumping energy for the other. The output of the pump laser is divided; one of the output beams is directed upon the laser medium of the second laser to serve as an optical pumping means therefor, and the other part is mixed in a nonlinear optical means with the output laser radiation from the second laser to produce wavelength-tunable radiation. In a preferred system, a Q-switched ruby laser is employed to pump a wavelength-tunable dye laser and an output from each is mixed in a phase-matched $LiNbO_3$ crystal to provide monochromatic wavelength-tunable radiation in the infrared region of the spectrum.

3,731,111
PULSE GENERATOR

Thomas H. Charters, 6855 S.W. Raleighwood Way, Portland, Oreg.

Filed May 15, 1972, Ser. No. 253,462
Int. Cl. H03k 3/00
U.S. Cl. 307—106 14 Claims

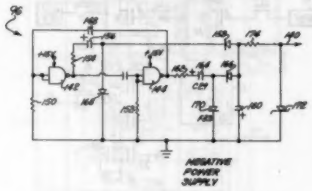


A pulse generator for providing electrical impulses used for relieving muscle spasm comprises a low impedance source including a capacitor in parallel with a battery connected to one terminal of a step-up transformer's primary winding and a multivibrator switching circuit connected to the remaining terminals of the transformer's primary winding. The multivibrator is adapted for periodically completing the primary circuit and includes R-C time constant means causing the pulse generator to supply an output of definite pulse width and pulse period.

3,731,112
REGULATED POWER SUPPLY WITH DIODE CAPACITOR MATRIX

Aubrey H. Smith, 6619 Pershing Boulevard, Kenosha, Wis.

Division of Ser. No. 131,624, April 6, 1971. This application Dec. 15, 1971, Ser. No. 208,488
Int. Cl. H02m 3/06
U.S. Cl. 307—109 6 Claims

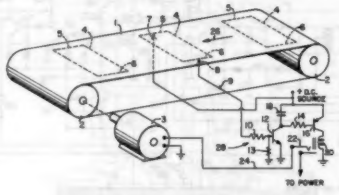


A regulated power supply is provided capable of energizing various components of a control system. The regulated power supply includes a negative power supply which comprises an astable multivibrator and a diode-capacitor matrix for directly converting a positive voltage to a regulated negative voltage.

3,731,113
BELT DAMAGE DETECTOR

Richard B. Lowe, Glendale Heights, Ill., and Robert S. Enabnit, Akron, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sept. 9, 1971, Ser. No. 178,977
Int. Cl. H01h 35/00
U.S. Cl. 307—119 5 Claims

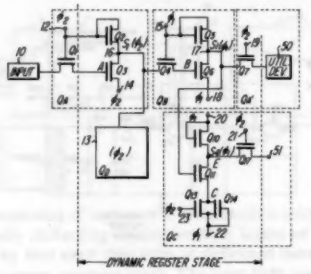


A detector for indicating when a tear or other damage occurs in a conveyor belt and automatically turning off the belt drive motor before further damage can occur. The detector utilizes one or more electrical conductors such as wire loops extending transversely across the belt which are either embedded within the belt or positioned on one surface of the belt. A stationary electrical contact is positioned adjacent each edge of the belt to contact an exposed contact portion of the loop. The stationary contacts are connected to a circuit which controls the power to the belt drive motor and when the stationary contacts touch the contact portions of one of the conductor loops, current will flow through the loop and so long as the current flow is not stopped by a break in the conductor loop, the circuit will maintain a closed power line to the motor driving the belt. If a rip occurs in the belt, the conductor loop is broken at that point, thereby stopping the flow of current in the loop. When this occurs, the circuit shuts off the drive motor, thereby stopping the belt before further damage can occur.

3,731,114
TWO PHASE LOGIC CIRCUIT

William Frederick Gehweiler, Moorestown, N.J., assignor to RCA Corporation, New York, N.Y.

Filed July 12, 1971, Ser. No. 161,479
Int. Cl. H03k *19/08*; G11c *19/00*
U.S. Cl. 307—205 5 Claims

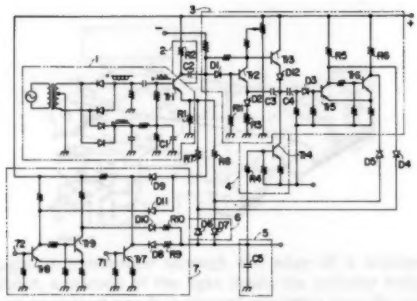


A gate network which permits two levels of logic to be performed by interconnected gate networks which are controlled by the same phase.

3,731,115
VOLTAGE MEMORY CIRCUIT

Saeki Yoshifumi, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Ohta-ku, Tokyo, Japan

Filed March 10, 1971, Ser. No. 122,869
Claims priority, application Japan, March 10, 1970, 45/19684
Int. Cl. G11c *11/34*; H03k *5/00*
U.S. Cl. 307—238 3 Claims



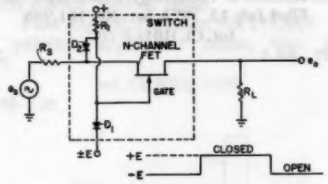
A circuit having a condenser, the charging voltage for said condenser being selected by an instruction signal, and after being selected, the selected charging voltage is constantly checked and automatically held.

3,731,116
HIGH FREQUENCY FIELD EFFECT TRANSISTOR SWITCH

Eugene R. Hill, Thousand Oaks, Calif., assignor to The United States of America as represented by the Secretary of the Navy

Filed March 2, 1972, Ser. No. 231,314
Int. Cl. H03k *17/60*
U.S. Cl. 307—251 8 Claims

An improved field effect transistor (FET) switching circuit for sampling an analog input in response to a control pulse at extremely fast turn-on and turn-off times. the FET operating potential is obtained from a constant voltage source rather than the control signal. A diode is provided between the FET

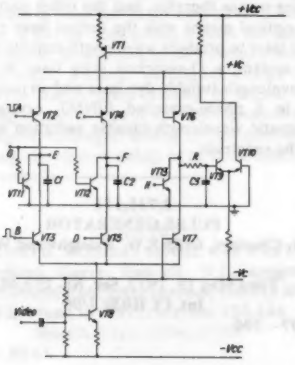


gate and the signal source and also a diode is provided between the FET gate and the control pulse source; the diodes retain sufficient stored charge to completely discharge the FET gate to channel capacitance during switching.

3,731,117
ELECTRONIC GATING CIRCUITS

Frank G. Everest, Stevenage, and Thomas P. Veasey, Hitchin, both of England, assignors to British Aircraft Corporation Limited, London, England

Filed Dec. 3, 1971, Ser. No. 204,458
Claims priority, application Great Britain, Dec. 4, 1970, 57,808/70
Int. Cl. H03k *17/60*
U.S. Cl. 307—254 9 Claims



In an electronic circuit in which a gating circuit is connected between a transistor or other semi-conductor element and an output terminal, the offset normally introduced by the transistor is cancelled by a compensating circuit responsive to variations in the D.C. level of the current passed by the transistor in the intervals between gating periods to derive a compensating signal which is operative during the gating periods to modify the output signal.

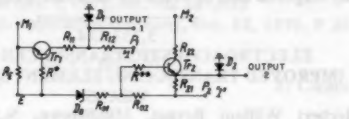
3,731,118
VOLTAGE DETECTOR FOR SENSING AND DIGITALLY ENCODING STATES OF POTENTIAL

Wolf-Henning Harms, Berlin, Germany, assignor to Krone GmbH, Berlin-Zehlendosb, Germany

Filed May 12, 1971, Ser. No. 142,534
Claims priority, application Germany, May 12, 1970, P 20 23 164.5
Int. Cl. H03k *17/00*
U.S. Cl. 307—255 7 Claims

In a detector for sensing four different states of potential applied to its input and for digitally encoding them at two detec-

tor outputs, there are provided two semiconductor components, each connected to the detector input and to one detector output; each semiconductor component is associated with a voltage divider, a reference source, a comparison



source and a digital source. On either detector output there may appear either a logic 1 or a logic 0, allowing four possible digital signal pair combinations at the detector output, whereby each digital signal pair characterizes one state of potential applied to the detector input.

3,731,119

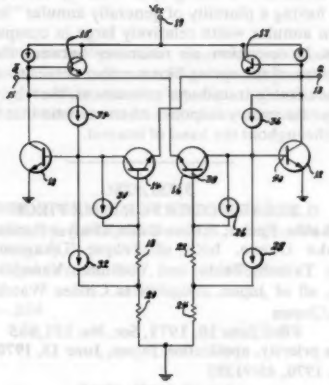
STATE RETENTION CIRCUIT FOR RADIATION HARDENED FLIP FLOP

Walter T. Matzen, Richardson, Tex., assignor to The United States of America as represented by the Secretary of the Air Force

Continuation-in-part of Ser. No. 828,172, May 27, 1969, abandoned. This application Nov. 10, 1971, Ser. No. 197,385

Int. Cl. H03k *3/286*

U.S. Cl. 307—291 **3 Claims**



A state retention apparatus for a radiation hardened flip flop for protecting the logic circuitry from radiation induced photocurrents. During periods of transient ionizing pulses of a predetermined magnitude, a switching function is performed to protect the logic state of the flip-flop and after the transients have decayed below a predetermined level, the flip-flop is returned to normal operation.

3,731,120

DIGITAL COMPACT CONTROL MODULE

Dieter Eichmann, Erlangen; Gunter Heyer, Amberg; Ulrigh Schaff, Erlangen, and Gunter Voigt, Karlsruhe, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin, Munich, Germany

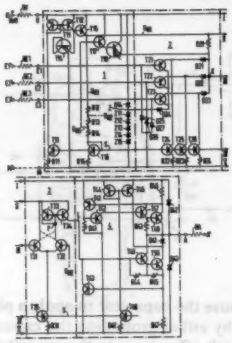
Filed March 29, 1971, Ser. No. 128,688

Claims priority, application Germany, April 2, 1970, P 20 15 639.2

Int. Cl. H03k *19/08*

U.S. Cl. 307—213 **14 Claims**

A compact module with several AND or NAND stages, designed as a monolithic integrated circuit, comprises a fully integrated current feeder circuit, consisting of a transistor-resistor combination which can be connected to the supply voltage source, and is coupled to all gates of each control module. In order to expand the permissible range of the operating and control voltages of the gate circuit elements, at least a portion



of the associated, current-determining resistance is replaced by regulating transistors, on the collector-emitter circuits of which a constant current is impressed in each case as a function of a voltage taken from the transistor-resistor combination of the current feeder circuit.

3,731,121

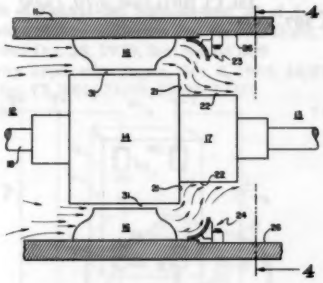
COMMUTATOR AIR DEFLECTOR

William K. Cook, North East, and Barry J. Turley, Wattsburg, both of Pa., assignors to General Electric Company, Erie, Pa.

Filed Dec. 22, 1971, Ser. No. 211,001

Int. Cl. H02k *9/28*

U.S. Cl. 310—227 **10 Claims**



An air deflector for diverting the flow of forced air moving axially through a motor stator from the drive-end thereof, radially inwardly proximate the armature - commutator transistion point, to cause increased air flow directly over the commutator surface and thereby increase the heat transfer therefrom. Annular sections having concave surfaces toward the commutator are rigidly secured on the stator inner wall to provide the baffle effect.

3,731,122

ELECTRICALLY CONTROLLED RESISTIVE WEIGHTS

Erik Rosenbaum, Randallstown, and Edward George Klimchak, Owings Mills, both of Md., assignors to The Bendix Corporation, Southfield, Mich.

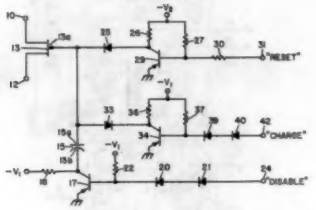
Filed March 31, 1971, Ser. No. 129,729

Int. Cl. H03k *1/14*

U.S. Cl. 307—264 **7 Claims**

A field effect transistor has a source-drain circuit which functions as a variable electrical resistance. A memory capaci-

tor has one end connected to the field effect transistor gate and the second end connectable through a switching transistor to ground. Charges are added or subtracted from the capacitor to vary the FET gate bias and thereby the FET drain-source resistance. The switching transistor is effective to either apply the capacitor voltage to the FET gate or al-



ternately to cause the capacitor to apply a pinch-off voltage to the FET gate by either grounding the capacitor's second end or applying pinch-off voltage to the capacitor's second end. In either event the charge across the capacitor is unaltered. The electrically controlled weight described is particularly adapted for use in a hyperplane signature recognizer.

3,731,123

MAGNETIC FIELD DETECTING APPARATUS

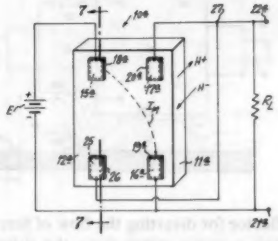
Takeshi Matsushita, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 888,377, Dec. 29, 1969, abandoned, and a continuation-in-part of Ser. No. 873,399, Nov. 3, 1969, abandoned, and a continuation-in-part of Ser. No. 873,162, Nov. 3, 1969, abandoned. This application March 21, 1972, Ser. No. 236,776

Claims priority, application Japan, Nov. 5, 1968, 43/80836; Nov. 5, 1968, 43/80837; Dec. 28, 1968, 43/858

Int. Cl. H01l *5/00, 9/10, 13/00*

U.S. Cl. 307—309 **7 Claims**



A magnetic field detecting apparatus comprises a semiconductor substrate, preferably of a substantially intrinsic material, having at least first, second and third spaced apart regions of relatively high impurity concentration formed therein, with the first and second regions being of opposite conductivity types and forwardly biased by connection to a voltage source for injecting respective carriers, for example, holes and electrons, and for supplying a main current along a path between the first and second regions which are spaced from each other by a distance greater than the sum of the diffusion lengths of the carriers injected at the first and second regions, respectively. The third region is of the same conductivity type as the first region and reverse biased, preferably through the output region connected to the second and third regions, so as to be adapted for collecting the carriers injected by the first region, and the third region is closer to the first region than to the second region and spaced from the path of the main current by a distance which, in the absence of any magnetic field, is greater than the diffusion length of the carriers injected at the first region so that the output circuit provides an output signal that sensitively corresponds to the strength and direction of any magnetic field to which the substrate is subjected.

3,731,124

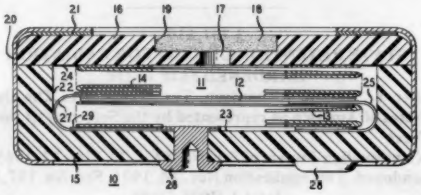
ELECTROACOUSTIC TRANSDUCER HAVING IMPROVED TRANSDUCING ELEMENT SUPPORTING MEANS

Herbert William Bryant, Middletown, N.J., assignor to Bell Telephone Laboratories Incorporated, Murray Hill, N.J.

Filed Oct. 18, 1971, Ser. No. 190,207

Int. Cl. H01v *7/00;* **H04r** *17/00*

U.S. Cl. 310—9.4 **11 Claims**



An electromechanical transducer element is supported within a transducer housing by at least one folded spring-like member having a plurality of generally annular "leaves" each having an annular width relatively large in comparison to its thickness. In operation, air resistance between the leaves or convolutions of the spring-like member serves to acoustically damp undesirable transducer resonances, thereby providing a transducer frequency response characteristic that is relatively uniform throughout the band of interest.

3,731,125

PULSE MOTOR FOR TIME PIECE

Akira Nikaido, Fuchu; Mitsuo Onda, Omiya; Fumio Nakajima, Terutaka Okano, both of Tokyo; Takayasu Machida, Iruma; Takashi Toida, and Yoshihiko Yanagawa, both of Tokyo, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed June 10, 1971, Ser. No. 151,865

Claims priority, application Japan, June 13, 1970, 45/59037; Sept. 14, 1970, 45/91383

Int. Cl. H02k *37/00*

U.S. Cl. 310—49 **3 Claims**

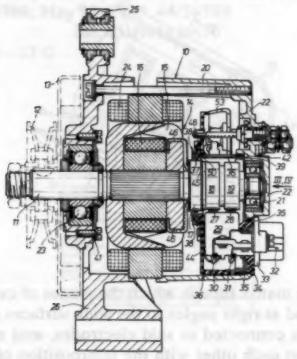
A pulse motor for use in time pieces comprises a stator which defines a circular space, and a circular rotor provided with a plurality of equally spaced slots extending inwardly from the periphery of the rotor at an angle to the radial direction. The rotor is concentrically disposed in said space so that a uniform annular interstice is formed between the stator and rotor. An index finger or pawl, provided for preventing backward motion of a ratchet wheel fixed to the shaft of the rotor, contacts only the tip portion of a tooth of the ratchet wheel.

3,731,126

ELECTRICAL MACHINE WITH SHIELDED CIRCUIT PARTS

Walter Hagenlocher, Leonberg, and Georg Binder, Stuttgart, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Oct. 7, 1971, Ser. No. 187,432
Claims priority, application Germany, Oct. 12, 1970, P 20 49 962.1
Int. Cl. H02k 5/10
U.S. Cl. 310—68 27 Claims



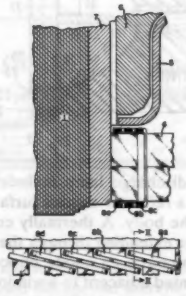
An alternating current generator is provided with an insulating casing closed by an end cover of the housing and supporting circuit parts while enveloping slip rings and contact brushes so that the same are protected from dirt and splashed water.

3,731,127

GENERATOR END TOOTH FLUX SHIELD

Dean B. Harrington, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 19, 1971, Ser. No. 190,537
Int. Cl. H02k 1/12
U.S. Cl. 310—254 3 Claims



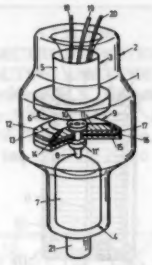
A shield for the end of a laminated dynamoelectric machine stator core to reduce penetration of the stray end region flux into the tooth portion of the stator core. The shield comprises electrically conductive material encircling the stator armature bars as they emerge from the slots comprising individual overlapped coils, or alternatively, radially spaced rings with interconnecting radial conductors between bars.

3,731,128

X-RAY TUBE WITH ROTARY ANODES

Klaus Haberrecker, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Erlangen, Germany

Filed March 8, 1972, Ser. No. 232,853
Int. Cl. H01j 35/10
U.S. Cl. 313—60 8 Claims



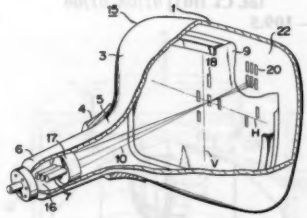
An X-ray tube has a rotary anode which is a compound body of heavy metal and graphite parts, the focal spot path lying upon the heavy metal. The invention is particularly characterized by the provision of a layer of metal selected from the group consisting of tantalum and/or tungsten and located between the heavy metal part and the graphite part. The heavy metal part consists at least primarily of molybdenum, is shaped as a plate and is soldered to the graphite part outside of the focal spot path.

3,731,129

RECTANGULAR COLOR TUBE WITH FUNNEL SECTION CHANGING FROM RECTANGULAR TO CIRCULAR

Asahide Tsuneta, Kawasaki-shi; Yasuo Ohta, and Makoto Ikegaki, both of Fukaya-shi, Saitama-ken, all of Japan, assignors to Tokyo Shibaura Electric Co., Kawasaki-shi, Japan

Filed Oct. 28, 1970, Ser. No. 84,809
Claims priority, application Japan, Nov. 4, 1969, 44/87632
Int. Cl. H01j 29/00, 29/06, 31/20
U.S. Cl. 313—64 1 Claim



A color receiving tube having a maximum deflection angle of greater than 90° disposed close to phosphorescent surface, the perforations of the mask being formed as slits arranged in vertical rows, and an electron gun assembly comprised by three unit electron guns disposed in-line on a common horizontal plane. The deflecting portion of the tube, around which is disposed a deflecting device, is formed as a funnel whose cross-sectional configuration gradually varies from that similar to the configuration of the reproduced image to circular.

3,731,130
WOUND-FILM DRY CAPACITORS

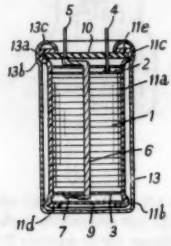
Pulin Kumar Dutta, Poona, India, assignor to Plessey Handel Und Investments AG, Zug, Switzerland

Filed Feb. 10, 1972, Ser. No. 225,225

Claims priority, application Great Britain, March 2, 1971, 5,759/71

Int. Cl. H01g 1/02

U.S. Cl. 317—258 **10 Claims**



A wound-film capacitor of metallized polypropylene film is mechanically strengthened, and made more fire-resistant, and the risk of oxidation of its metallized layer is reduced, by placing a sleeve of polyvinyl-chloride plastics round the would coil and the adjacent decks and heat-shrinking it to form a sheath in tight, shape-hugging contact with the wound-film unit and the decks and a sealing disc of greater diameter before the thus completed unit is placed into a can, with the thus wrapped radially projecting part of the sealing disc resting against an internal shoulder of the can.

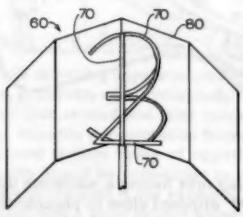
3,731,131
GASEOUS DISCHARGE DISPLAY DEVICE WITH IMPROVED CATHODE ELECTRODES

George A. Kupsky, Milford, N.J., assignor to Burroughs Corporation, Detroit, Mich.

Filed Oct. 13, 1971, Ser. No. 188,850

Int. Cl. H01j 61/08, 61/66

U.S. Cl. 313—109.5 **12 Claims**



A display device includes an envelope having a gas filling, at least one anode electrode, and at least one cathode electrode for operation therewith. The cathode electrode comprises a metal plate having a conductive coating comprising pure metal particles in a glass carrier matrix.

3,731,132
GAS DISCHARGE TUBE HAVING A NUMBER OF JUXTAPOSED MATRIX GROUPS FOR DISPLAYING CHARACTERS

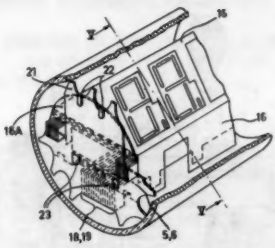
Adrianus Antonius Maria Hendriks, Emmasingel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 6, 1971, Ser. No. 186,913

Claims priority, application Netherlands, Oct. 17, 1970, 7015261

Int. Cl. H01j 61/66

U.S. Cl. 313—109.5 **4 Claims**



A multiple matrix tube in which the planes of cathodes and anodes extend at right angles to the wide surfaces of the connection strips connected to said electrodes, said strips being placed against each other with the interposition of insulating strips.

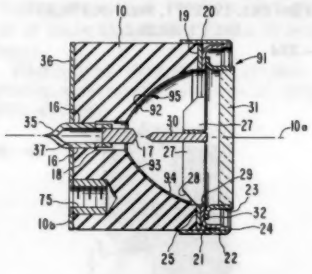
3,731,133
HIGH-INTENSITY ARC LAMP

Russell C. McRae, Cupertino, and William R. Stuart, San Carlos, both of Calif., assignors to Varian Associates, Palo Alto, Calif.

Continuation-in-part of Ser. No. 109,527, Jan. 25, 1971, abandoned. This application Jan. 7, 1972, Ser. No. 216,025

Int. Cl. H01j 5/16; H01k 1/28

U.S. Cl. 313—113 **13 Claims**



A short arc gas discharge lamp includes a solid ceramic body provided with a reflector-shaped surface extending from one end face into the body. A thermally conductive tube inserted in an aperture extending through the other end face of the ceramic body supports an anode opposite to a cathode. The cathode is mounted adjacent to a window of the lamp and in predetermined relationship to the one end face of the body so that the point of highest intensity of a gas discharge within the lamp will be located at the focal point of the reflector surface. In one embodiment of the lamp, the reflector-shaped surface of the ceramic body is metallized to provide a reflective surface, whereas in a second embodiment the reflector-shaped surface is provided with a smooth glazed coating that is suitable for direct reception of a metallic reflective coating without the use of intermediate metallizing steps such as plating and polishing.

3,731,134
COLOR PICTURE TUBE UTILIZING A SHADOW MASK WHICH SELECTS COLORS AND DETECTS THE DISPLACEMENT OF THE BEAM

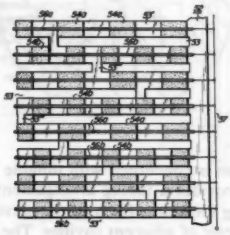
Teiji Iida, Chiba-ken, Japan, assignor to Hitachi, Ltd., Tokyo and Teiji Iida, Chiba-ken, Japan

Filed June 25, 1969, Ser. No. 836,424

Claims priority, application Japan, June 28, 1968, 43/45337; Oct. 24, 1968, 43/92713 (utility model); Oct. 24, 1968, 43/92714 (utility model); Nov. 11, 1968, 43/81915; Jan. 20, 1969, 44/3935; Jan. 20, 1969, 44/3936; Feb. 8, 1969, 44/9440; March 14, 1969, 44/19369; March 14, 1969, 44/22806 (utility model); April 9, 1969, 44/27510; May 13, 1969, 44/36788; May 13, 1969, 44/36789

Int. Cl. H01j *29/70*

U.S. Cl. 315—21 C **24 Claims**



A color picture tube having a shadow mask which has, in addition to the function of selecting colors depending on the difference in incidence angles of a plurality of electron beams, a function of detecting the displacement of such electron beams. A signal thereby obtained is utilized so as to automatically correct vertical displacement and out-of-focussing of the electron beams thereby to increase the density of the electron beams impinging against the fluorescent screen and to improve the brightness and resolution of the picture obtained.

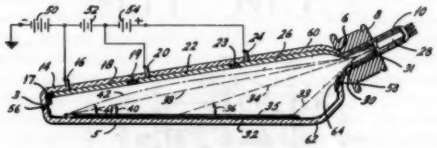
3,731,135
GRADED FIELD CATHODE RAY TUBE

Robert A. Iadicicco, Philadelphia, and Paul G. Wolfe, Oreland, both of Pa., assignors to Philco-Ford Corporation, Philadelphia, Pa.

Filed June 15, 1970, Ser. No. 46,020

Int. Cl. H01j *29/56*

U.S. Cl. 315—31 R **8 Claims**



A cathode ray tube having a screened flat faceplate and an electron gun oriented off-normal thereto, in which means are provided to produce in the vicinity of the screen an electrostatic field shaped so as to sharpen electron beam focus over the entire screen and reduce raster distortion thereover.

Discrete sections of the backplate portion of the tube are coated with conductive material. Operating potentials are supplied to each such conductive section and to the screen to create electrostatic fields in the regions between the screen and each conductive section. The shape of the conductive sections and the operating potentials are selected so that the forces exerted on the electron beam when deflected toward the portion of the screen remote from the electron gun bend the beam toward the screen. This bending causes the beam to impinge on the screen along a path more nearly perpendicular to the screen at the point of impingement of the beam than the path which the beam would follow in the absence of such bending. As a result the area of the region of intersection of beam and screen is reduced, sharpening the focus. By additional appropriate shaping of the electrostatic fields, raster distortion also is reduced.

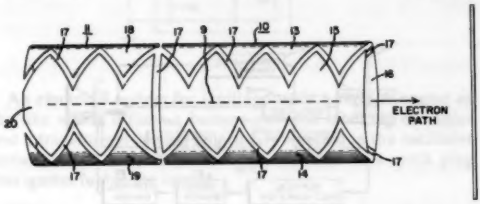
3,731,136
CYLINDRICAL ELECTRODE SYSTEM FOR FOCUSING AND DEFLECTING AN ELECTRON BEAM

Alfred G. Roussin, Syracuse, N.Y., assignor to General Electric Company, Syracuse, N.Y.

Filed April 19, 1971, Ser. No. 135,240

Int. Cl. H01j *29/56*

U.S. Cl. 315—16 **10 Claims**



An electron optical system permitting both focusing and deflection of an electron beam utilizes a plurality of sets of electrodes, each set of electrodes comprising two pairs of conductive coatings distributed according to a predetermined pattern and formed coaxially with the path of the undeflected electron beam emerging from a cathode. The electrodes of each set are formed of substantially the same radius of curvature, and the sets are aligned, one ahead of the other, along the path of the undeflected electron beam.

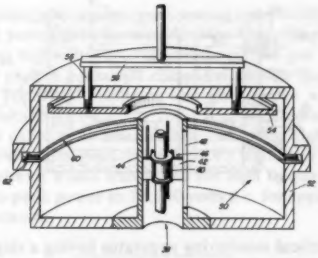
3,731,137
COAXIAL MAGNETRON

Robert J. Foreman, Southboro, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Feb. 3, 1972, Ser. No. 223,250

Int. Cl. H01j *25/50*

U.S. Cl. 315—39.77 **12 Claims**



A coaxial magnetron having a cylindrical cavity operating in a circular mode is tuned by means circumferentially disposed in the region of maximum electric field intensity. In one embodiment a ring tuner is retained within an annular groove at the midpoint of the outer cavity wall and adapted to be reciprocated in introduce a dissymmetry in the cavity geometry along a path transverse to its axis. The paths of the electric field currents are altered by each excursion of the

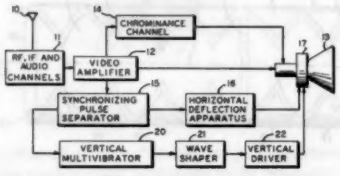
tuner. Dither tuning of the disclosed structure provides a frequency agility in transmission systems over a portion of the frequency band. Another embodiment provides for the combination with a large plate-type tuner to add a fine tuning capability over a portion of a broad frequency band. Temperature compensation is also attainable by means of the ring tuner arrangement.

3,731,138

SIGNAL GENERATING CIRCUIT FOR A DEFLECTION SYSTEM

William Elias, Batavia; Valdes Silverio Antonio, Alexander, and George Cleveland Waybright, Oakfield, all of N.Y., assignors to GTE Sylvania Incorporated, Seneca Falls, N.Y.

Filed Aug. 26, 1971, Ser. No. 175,159
Int. Cl. H01j *29/70*
U.S. Cl. 315—29 **13 Claims**



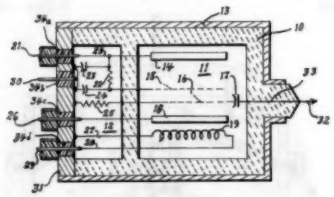
A signal generating circuit for generating a signal of a predetermined waveform for application to a deflection winding of a deflection yoke associated with a cathode ray tube is disclosed. The signal generating circuit includes a linearity or branch circuit for varying the charging rate of a capacitor which wave shapes the voltage across the capacitor.

3,731,139

INTERFACE AMPLIFIER

Robert J. Herickhoff, Mankato, and William D. Kimmel, Saint Paul, both of Minn., assignors to The United States of America as represented by the Secretary of the Air Force

Filed Nov. 16, 1970, Ser. No. 90,072
Int. Cl. H01j *7/44*
U.S. Cl. 315—33 **5 Claims**



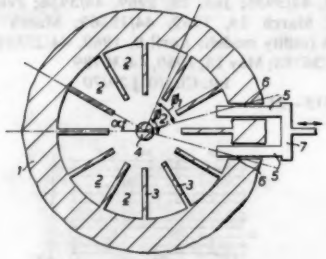
An electrical monitoring apparatus having a single ceramic envelope encased in a ground shield with two separated evacuated compartments, contained in one of the compartments are the active electrical components of a vacuum tube amplifier and in the other compartment are the associated passive electrical components that are used in conjunction with the operation of the vacuum tube amplifier. The input terminal to the amplifier is physically positioned at one end of the ceramic envelope, while the output and all other circuit connections are at the other end. Thus, the possibility of electrical interference due to radiation effects when the apparatus is used in a gamma environment are minimized.

3,731,140

MAGNETRONS

Peter Frederick Lewis, Chelmsford, England, assignor to English Electric Valve Company Limited, London, England

Filed July 14, 1971, Ser. No. 162,532
Claims priority, application Great Britain, Aug. 8, 1970, 38,342/70
Int. Cl. H01j *25/50*
U.S. Cl. 315—39.61 **6 Claims**



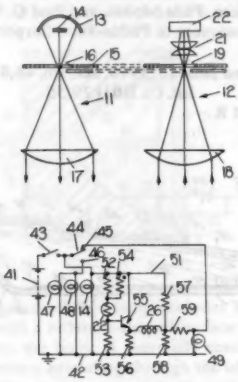
The invention is concerned with tunable multi cavity magnetrons and provides a tuning arrangement having only two movable tuning elements. Each of the elements is associated with one of a pair of adjacent cavities. The two movable elements are moved together and are arranged such that for any position of the tuning elements the two adjacent cavities are tuned to identical frequencies.

3,731,141

ROAD VEHICLE LIGHTING SYSTEMS

Harris Vernon Hicks, 61 Ferndale Road, Lichfield, England

Filed Nov. 15, 1971, Ser. No. 198,534
Claims priority, application Great Britain, Nov. 20, 1970, 55,209/70
Int. Cl. B60q *1/14*
U.S. Cl. 315—83 **2 Claims**



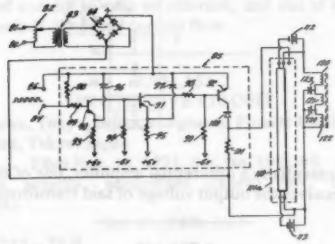
A road vehicle lighting system has first and second dipped beam headlamps, one main beam headlamp and a projector receiver unit which replaces the second main beam headlamp. The unit projects a divergent beam of light, and cuts off sufficient of that beam to prevent dazzling an oncoming driver. The normal dip switch is employed but is arranged to energize the projector-receiver unit in both positions of the dip switch, and when the dip switch is in its second position the minimum strength of the signal required by the receiver to operate the projector receiver unit is increased.

3,731,142

HIGH-FREQUENCY FLUORESCENT TUBE LIGHTING CIRCUIT WITH ISOLATING TRANSFORMER

Joel S. Spira, Allentown, and Joseph Licata, Schnecksville, both of Pa., assignors to Lutron Electronics Co., Inc., Coopersburg, Pa.

Continuation-in-part of Ser. No. 843,927, July 23, 1969. This application Aug. 20, 1971, Ser. No. 173,530
Int. Cl. H05b *39/00*
U.S. Cl. 315—94 11 Claims



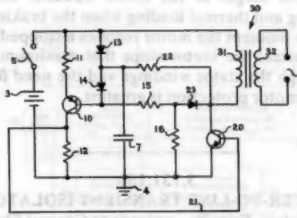
A pulse forming network, energized through a semiconductor switching circuit, contains an inductance and capacitance which develop a high-frequency pulse output. The inductance of the pulse forming network serves as the primary winding of a step-up voltage transformer which has a secondary winding connected in series with a gas discharge device where the voltage across the gas discharge device is higher than the voltages seen by the semiconductor device.

3,731,143

TRANSISTORIZED IGNITION SYSTEM FOR GAS TURBINE ENGINES

Kaushik H. Thakore, Sidney, N.Y., assignor to The Bendix Corporation, Southfield, Mich.

Filed Feb. 25, 1972, Ser. No. 229,333
Int. Cl. H03k *3/30*
U.S. Cl. 315—209 T 4 Claims



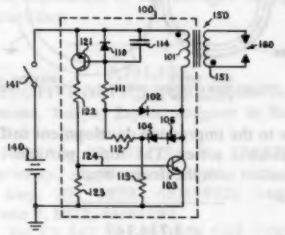
An ignition system for a gas turbine engine that includes a 2-transistor oscillator which utilizes a transformer and requires only a spark plug in the secondary of the transformer to ignite fuel in the turbine.

3,731,144

DIRECT CURRENT POWERED IGNITION SYSTEM WITH BLOCKING OSCILLATOR

James E. McKeown, Sidney, N.Y., assignor to The Bendix Corporation, Southfield, Mich.

Filed Feb. 25, 1972, Ser. No. 229,332
Int. Cl. H05b *37/02*
U.S. Cl. 315—209 T 4 Claims



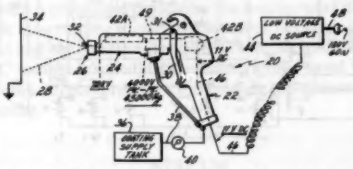
An electrical system for igniting fuel in a turbine engine or the like which utilizes a battery-powered blocking oscillator and a transformer having its primary winding in the oscillator circuit and its secondary winding connected to a spark plug that ignites fuel in the engine.

3,731,145

ELECTROSTATIC SPRAY GUN WITH SELF-CONTAINED MINIATURIZED POWER PACK INTEGRAL THEREWITH

Robert S. Senay, Lake Carmel, N.Y., assignor to Nordson Corporation, Amherst, Ohio

Filed Nov. 23, 1970, Ser. No. 92,114
Int. Cl. B05b *5/02*
U.S. Cl. 317—3 52 Claims



An electrostatic spray gun having physically integral therewith a power pack for transforming low voltage supplied to the gun to high voltage for application to the gun electrode. The power pack is contained completely within the gun, and includes a combined oscillator and transformer which converts low voltage d.c., e.g., 11 volts, supplied to the gun via a low voltage cable to an intermediate voltage at high frequency, e.g., 6,000 volts peak-to-peak at 45 KHz; and a voltage multiplier circuit which transforms the high frequency 6,000 volt peak-to-peak power to 72,000 volts d.c. for application to the gun electrode.

3,731,146

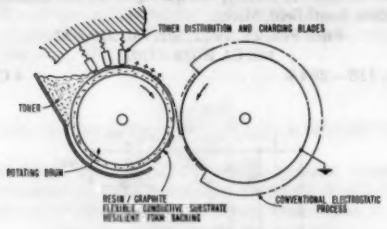
TONER DISTRIBUTION PROCESS

Albert C. Bettiga, and Leo S. Chang, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 23, 1970, Ser. No. 100,971
Int. Cl. G03g *13/08*
U.S. Cl. 317—3 5 Claims

Toner is distributed and charged on an impression development surface by contact with at least one doctor blade electri-

cally insulated relative to other parts of the apparatus and made of material remote from the toner in the triboelectric series and close to the impression development surface material in the triboelectric series. The toner particles are charged because of contact with the doctor blade.

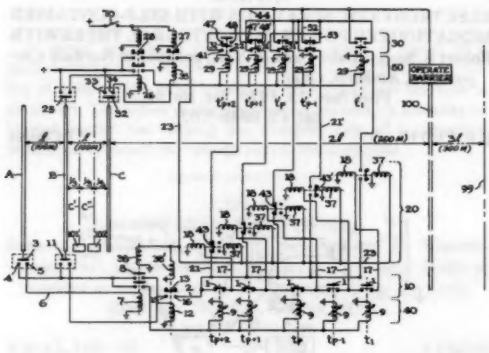


3,731,147

DEVICE FOR MEASURING THE ACCELERATION OF A VEHICLE

Jean Lavarenne, Villecresnes, France, assignor to Societe Nationale Industrielle Aerospatiale, Paris, France

Filed May 21, 1971, Ser. No. 145,835
Claims priority, application France, May 27, 1970, 7019444
Int. Cl. H02p
U.S. Cl. 317—5 **5 Claims**



A ground device for measuring the acceleration of a vehicle on a speed basis in which at least three primary switches operate by three sensors, time-delayed relays being adjusted to be effective in causing stepped triggering of a number of storage flip-flop contacts whereby to store a first classification of a first average speed and a second speed classification of a second average speed, a certain chosen difference between said second and first average speeds producing an output signal if its detection occurs before transiting of the vehicle beyond said speed basis resets the storage flip-flops in their neutral state.

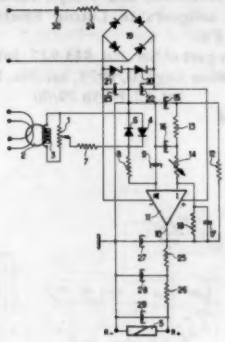
3,731,148

HIGH-SENSITIVITY DIFFERENTIAL RELAY PROTECTED AGAINST DISTURBANCES

Jean-Francois Fournis, Grenoble, France, assignor to Societe D'Appareillage Electrique Saparel, Saint-Marcellin, France

Filed March 15, 1971, Ser. No. 124,639
Claims priority, application France, March 13, 1970, 7009178
Int. Cl. H02h *1/02*
U.S. Cl. 317—18 D **6 Claims**

A differential relay comprising a homopolar transformer and a parallel electromechanical relay having low power consumption comprising an amplifier disposed between the output of the homopolar transformer and the electromechanical relay and characterized in that the aforementioned amplifier comprises essentially a differential amplifier, one of the inputs of which receives the output voltage of said transformer.



3,731,149

ARC SUPPRESSION, MOTOR PROTECTION AND DYNAMIC BRAKING NETWORK FOR A.C. MOTORS

Lawrence V. Sherman, Kirkland; Richard A. Marson; Jack D. Keeler, both of Seattle, and Edmund I. Fagan, Bellevue, all of Wash., assignors to EMF Corporation, Seattle, Wash.

Continuation-in-part of Ser. No. 9,736, Feb. 9, 1970, which is a continuation-in-part of Ser. No. 815,811, April 14, 1969. This application Aug. 30, 1971, Ser. No. 176,099
Int. Cl. H02h *3/00*
U.S. Cl. 317—11 A **4 Claims**

Arc suppression, motor protection, and dynamic braking network for A.C. motors. Rectifying means are used to provide positive polarity half-cycle power or interrupted pulsating current to one side of an A.C. motor. The back EMF of the motor maintains the stationary magnetic field during the negative half cycle of power in the braking circuit. The electro-inertial characteristics of sudden braking and stopping action produce power surges in the motor circuits. The network reduces arcing and thermal loading when the braking circuit is opened at the moment the motor reaches a stopped condition. It is at the instant the motor stops that maximum current is passing through the stator windings and the need for arc suppression and motor protection is greatest.

3,731,150

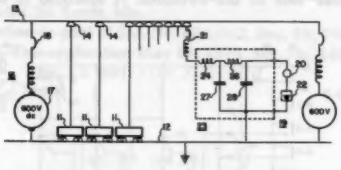
FILTER-TO-LINE TRANSIENT ISOLATOR

Earnest F. Weiser, Erie, Pa., assignor to General Electric Company, Erie, Pa.

Filed Jan. 5, 1972, Ser. No. 215,572
Int. Cl. H02h *7/10*
U.S. Cl. 317—20 **8 Claims**

A device serially coupled between a wayside power source and the input filter of a chopper or inverter propulsion circuit, for attenuating the rate of charge and discharge of input filter capacitors to the wayside power source during the respective

application and interruption of power to the input circuit. A saturable reactor in parallel with a resistor effectively switches

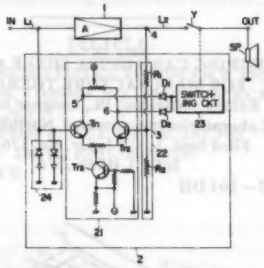


the resistance into the circuit to impede current flow during periods of current in-rush or out-rush, and out of the circuit during periods of normal current flow.

3,731,151
PROTECTIVE CIRCUIT

Akio Ozawa, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Nov. 16, 1971, Ser. No. 199,208
Claims priority, application Japan, Nov. 16, 1970, 45/113493
Int. Cl. H02h *3/28*
U.S. Cl. 317—27 R **3 Claims**

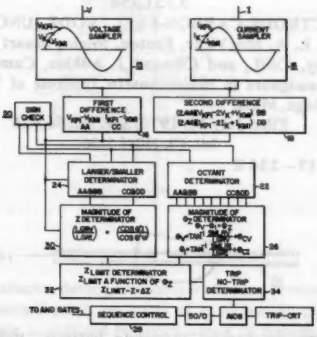


A protective circuit for protecting an output circuit and a load circuit of a signal amplifier from abnormal conditions, and including a differential amplifier for detecting the abnormal conditions of and a clipping circuit clipping a signal applied to one of the input terminals of the differential amplifier higher than a predetermined voltage.

3,731,152
IMPEDANCE DISTANCE RELAY

George D. Rockefeller, Jr., Morris Plains, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 25, 1972, Ser. No. 256,668
Int. Cl. H02h *3/40*
U.S. Cl. 317—27 R **37 Claims**

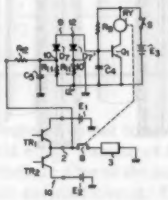


An apparatus for determining the peak value of the sinusoidal component of an electrical quantity which may include a non-sinusoidal component by means of comparing the first and second differential magnitudes of the electrical quantity at any time interval of the period of the sinusoidal component whereby the value of any low rate of change component is attenuated, as for example the D.C. offset which is normally present during fault conditions. The apparatus also includes means to determine the phase angles between two sinusoidal components and when such two sinusoidal components represent current and voltage to determine the magnitude of the impedance of the network energized by said sinusoidal quantities.

3,731,153
PROTECTIVE DEVICE FOR LOUDSPEAKER

Akira Nishimoto, Tokyo, Japan, assignor to Sansui Electric Co., Ltd., Tokyo, Japan

Filed Aug. 25, 1971, Ser. No. 174,875
Claims priority, application Japan, Aug. 27, 1970, 45/85091; Aug. 27, 1970, 45/85092; Aug. 27, 1970, 45/85093; June 9, 1971, 46/40184
Int. Cl. 317 *36 TD*; H02h *3/08, 7/00*
U.S. Cl. 317—33 R **5 Claims**



In an audio amplifier comprising first and second transistors with their emitter-collector circuits connected in series to provide an output terminal, first and second sources respectively connected in series with the first and second transistors and a loudspeaker connected directly to the output terminal, there is provided a protective device for the loudspeaker comprising a circuit interrupting element connected between the output terminal and the loudspeaker and a control circuit responsive to a DC voltage exceeding a predetermined level which appears at the output terminal for operating the circuit interrupting element.

3,731,154
SURGE ARRESTER, PREDOMINANTLY FOR POWER TRANSMISSION LINES

Argist Saakovich Torosian, Leningradskaya ulitsa, 8, kv. 10, Erevan, U.S.S.R.

Filed Nov. 12, 1971, Ser. No. 198,307
Int. Cl. H02h *9/06*
U.S. Cl. 317—70 **4 Claims**

The present invention relates to surge arresters for power transmission lines, characterized in that their auxiliary circuits incorporate stabilizing means, such as Zener or avalanche diodes connected in series with firing means provided in the same circuit.

3,731,155

ROM ROD STORAGE MATRIX WITH ELECTRICAL COMPONENTS IN ADJACENT ROD BLOCKS

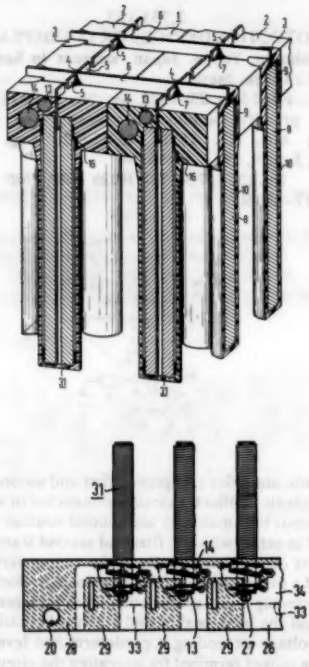
Ferdinand Utner, Regensburg, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed March 30, 1972, Ser. No. 239,533

Claims priority, application Germany, April 7, 1971, P 21 17 063.8

Int. Cl. G11b *1/04, 5/00*

U.S. Cl. 317—99 **14 Claims**



A ROM rod storage matrix comprises a plurality of similar side-bylside ROM rod blocks each containing several ROM rods and separately associated resistors and diodes, wherein a portion of the ROM rods are provided for the storage function while another portion of the ROM rods may be provided as respective magnetic flux return paths. Each of the ROM rods which participate in the storage function include a coil which is electrically connected to an electrical junction shared by the other ROM rods of a block, the connection being effected either directly or via one or more of the associated resistors and diodes. Another contact of each ROM coil is connected to another junction shared in common with a ROM coil from each of the side-by-side blocks, either directly or by way of one or more of the resistors and diodes, the common electrical connection being effected by means of an electrical conductor which is attached perpendicularly to the ROM rod blocks and extends transversely thereof.

3,731,156

ELECTRICAL COMBINATION LOCK AND VEHICLE THEFT PREVENTION SYSTEM

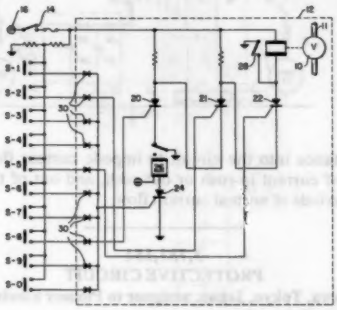
Donald G. Watson, 16 Stillmeadow Drive, Rochester, N.Y.

Filed May 21, 1971, Ser. No. 145,744

Int. Cl. H01h *47/00*; **F16k** *35/08*

U.S. Cl. 317—134 **2 Claims**

A combination lock controlled by an electronic circuit that responds to actuation of selected ones of a bank of switches in predetermined order and is inhibited in response to actuation of any other one of the switches. The circuit includes an array of SCR's connected in series, each triggerable by actuation of a selected one of the switches. A solenoid is energized in response to firing of the last SCR in the array to open the lock. When used in an automobile to deter theft, the solenoid is preferably connected to control a valve in the fuel line, and includes a self-holding contact so that, once energized it remains energized until the ignition switch is turned off.



3,731,157

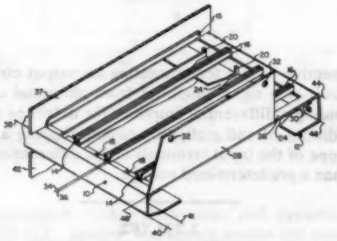
PRINTED WIRING CARD GUIDE SHELF AND A METHOD FOR MANUFACTURE THEREOF

William A. Reimer, Wheaton, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Sept. 1, 1971, Ser. No. 176,895

Int. Cl. H05k *7/18*

U.S. Cl. 317—101 DH **7 Claims**



A printed wiring card guide shelf is stamped as a unitary structure from a single sheet of stock material and formed to provide alignment and support for printed wiring cards.

3,731,158

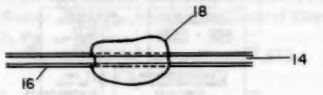
ELECTRODE-CARBON-ELECTRODE JUNCTIONS

Margaret L. A. MacVicar, Fenton, Mich.; Stuart M. Freake, Berkeley, Calif., and Clement J. Adkins, Cambridge, England, assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed July 20, 1970, Ser. No. 56,425

Int. Cl. H01l *5/06*

U.S. Cl. 317—234 R **10 Claims**

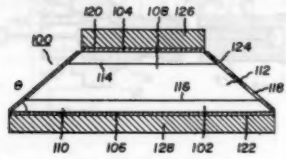


Quantum mechanical tunneling barriers, and non-linear gates are comprised of disordered carbon and integrated as the middle layer in electrode-carbon-electrode junctions.

3,731,159
MICROWAVE DIODE WITH LOW CAPACITANCE PACKAGE

Joseph A. McCann, Auburn, N.Y., assignor to Anheuser-Bush, Incorporated, St. Louis, Mo.

Continuation-in-part of Ser. No. 886,662, Dec. 19, 1969, abandoned. This application May 19, 1971, Ser. No. 144,989
Int. Cl. H01l *1/10, 5/00, 9/10*
U.S. Cl. 317—234 R 9 Claims

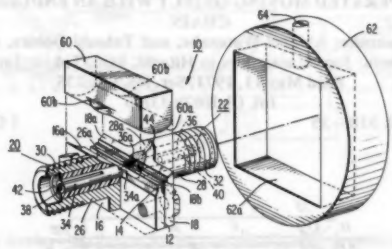


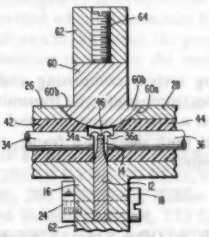
A microwave diode is packaged solely by contacts and a glass passivant layer adhered to the entire exterior surface of the diode mediate the contacts. The glass layer is of substantially uniform thickness of no less than one mil, exhibits a thermal coefficient of expansion in the range of from 2.6 to 4.8 × 10^{-6} in/in/°C and a dielectric constant in the range of from 6 to 18. The glass is in non-wetting association with the contacts.

3,731,160
MICROWAVE SEMICONDUCTOR DEVICE ASSEMBLY

Norman Sam Klein, Freehold, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 8, 1972, Ser. No. 251,385
Int. Cl. H01l *3/00, 5/00*
U.S. Cl. 317—234 R 8 Claims



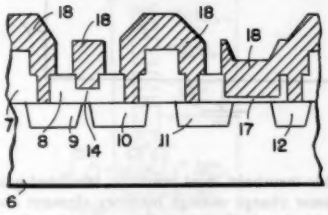


A semiconductor device assembly includes a semiconductor element mounted on a pedestal of a mounting plate. The mounting plate is secured between a pair of flanges, and coaxial terminals extend from the flanges. The co-axial terminals include outer ground plane walls and inner conductor pins electrically insulated from the outer walls. The conductor pins extend to the semiconductor element. The contacts of the semiconductor element are electrically connected to the mounting plate and conductor pins by short wires. A cover block is mounted on the flanges and extends over the semiconductor element. A retainer ring fits around the cover block and the flanges and firmly secures the cover block to the flanges.

3,731,161
SEMICONDUCTOR INTEGRATED CIRCUIT

Hirohiko Yamamoto, Tokyo, Japan, assignor to Nippon Electric Company Limited, Tokyo, Japan

Filed Sept. 3, 1971, Ser. No. 177,631
Claims priority, application Japan, Sept. 5, 1970, 45/78080
Int. Cl. H01l *19/00, 11/14*
U.S. Cl. 317—235 R 3 Claims

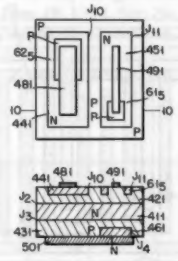


A semiconductor integrated circuit comprises a plurality of insulated gate type field effect transistors formed in a common semiconductor substrate. One of the transistors receives an input signal from an external circuit. The gate insulator film of the receiving transistor is thicker than the insulator film of the other insulated gate type field effect transistors formed on the common substrate.

3,731,162
SEMICONDUCTOR SWITCHING DEVICE

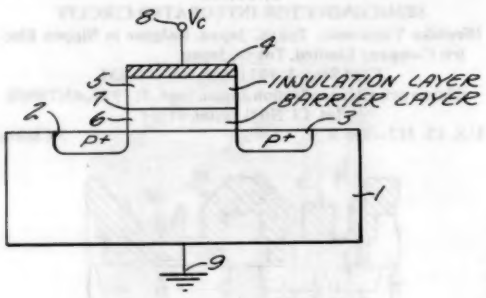
Masanobu Suenaga, Minami-ku, Yokohama; Tetsuo Machii, Meguro-ku, Tokyo, and Syuji Sugioka, Yokohama, Tsurumi-ku, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan

Filed Sept. 22, 1970, Ser. No. 74,504
Claims priority, application Japan, Sept. 25, 1969, 44/76101; Jan. 31, 1970, 45/8278
Int. Cl. H01l *11/10*
U.S. Cl. 317—235 R 2 Claims



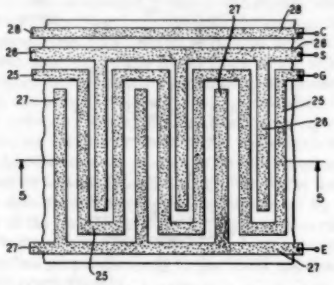
A semiconductor switching device comprising a semiconductor body having at least four regions arranged in succession, the adjacent ones thereof being of different conductivity types, a pair of main electrodes mounted on both sides of the semiconductor body and a gate electrode disposed on that side of the semiconductor body on which there is provided one of the main electrodes and spaced from said main electrode, wherein there are provided semiconductor shielding regions or discontinuous recesses for obstructing the flow of a gate current on at least part of the surface of the region between the gate electrode and said one main electrode.

3,731,163
LOW VOLTAGE CHARGE STORAGE MEMORY ELEMENT
Alexander J. Shuskus, West Hartford, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.
Filed March 22, 1972, Ser. No. 237,042
Int. Cl. H01l 11/14
U.S. Cl. 317—235 R **2 Claims**



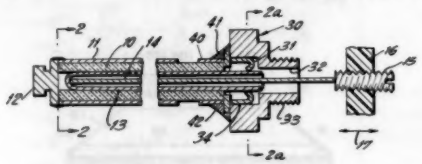
A variable threshold, dual insulator, insulated gate field effect transistor charge storage memory element comprises a relatively thin barrier layer of silicon dioxide adjacent to the semiconductor surface which has disposed thereon, beneath the gate metalization, a somewhat thicker layer of an insulator having a dielectric constant over 18. Dielectric materials include: strontium titanate ($SrTiO_3$), titanium dioxide (TiO_2), lead zirconate ($PbZrO_3$); refractory metal oxides, such as hafnium dioxide (HfO_2), zirconium dioxide (ZrO_2), tantalum oxide (Ta_2O_5), and tungsten oxide (WO_3); rare earth metal oxides; and ferroelectrics and antiferroelectrics.

3,731,164
COMBINED BIPOLAR AND FIELD EFFECT TRANSISTORS
Glen Trenton Cheney, Allentown, Pa., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Sept. 17, 1971, Ser. No. 181,478
Int. Cl. H01l 19/00
U.S. Cl. 317—235 R **6 Claims**



In an integrated circuit of the type in which the drain region of an insulated gate field effect transistor (IGFET) also constitutes a base region of a bipolar transistor, the IGFET has interdigitated source and drain regions separated by a serpentine channel region. An emitter stripe of the bipolar transistor is included in each drain region protrusion. This configuration increases the efficiency of modulation of the bipolar emitter currents by the IGFET channel currents.

3,731,165
TRIMMER CAPACITOR WITH SLOTTED PISTON
Benjamin Solow, North Hollywood, Calif., assignor to JFD Electronics Corp., Brooklyn, N.Y.
Filed Oct. 4, 1971, Ser. No. 185,988
Int. Cl. H01g 5/14
U.S. Cl. 317—249 T **11 Claims**

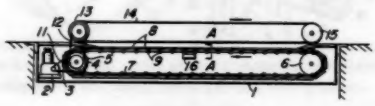


The movable piston of a piston trimmer capacitor has shallow narrow slots extending along its outer surface either longitudinally, or helically, to adjust the maximum capacitance of the unit while maintaining a close fit within a surrounding dielectric tube. Short slots are also placed at various longitudinal locations along the piston to adjust the functional relation between capacitance and piston position.

ERRATUM

For Class 317—258 see:
Patent No. 3,731,130

3,731,166
DUPLEX DRIVING SYSTEM FOR AN ELECTRICALLY OPERATED MOVING OBJECT WITH AN ENDLESS CHAIN
Isao Inuzuka; Akinori Watanabe, and Takeshi Oohira, all of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed May 11, 1971, Ser. No. 142,235
Int. Cl. H02k 33/00
U.S. Cl. 318—35 **1 Claim**

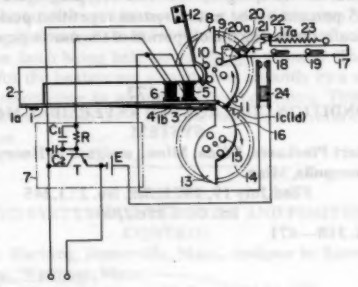


A duplex driving system comprising a driving means or linear motor for electromagnetically transmitting linear force interposed between a driving sprocket and an idle sprocket which is located at both sides of a frame, and on which an endless chain is wound.

3,731,167
STARTING DEVICE FOR A VIBRATING ELEMENT FOR TIME MEASURING MEANS
Nagao Mizutani, Hachioji, and Masamitsu Nojima, Tokyo, both of Japan, assignors to Citizen Watch Co. Ltd., Tokyo, Japan
Filed Dec. 23, 1971, Ser. No. 211,440
Int. Cl. H02k 33/10
U.S. Cl. 318—114 **3 Claims**

A starting device for a vibrating element in which the vibrat-

ing element is locked in a position of substantially the maximum amplitude prior to starting and instantaneously released



for free vibration at starting and, at the same time, a driving circuit for the element is energized.

3,731,168

BRAKE INSTALLATION FOR ELECTRICALLY DRIVEN VEHICLES

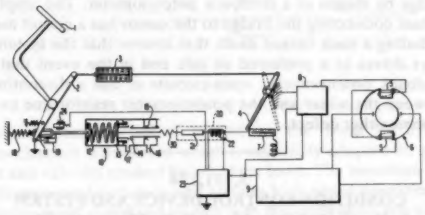
Paul E. Strifler, Dettingen, Teck, Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart-Unterturkheim, Germany

Filed Feb. 5, 1970, Ser. No. 8,970

Claims priority, application Germany, Feb. 5, 1969, P 19 05 641.8

Int. Cl. H02p *3/16*

U.S. Cl. 318—139 **14 Claims**



A brake installation for an electrically driven vehicle which includes mechanical brakes and utilizes the electric driving motor as electric brake by connecting it as generator, whereby the battery is recharged by this recovered energy; a control installation is provided which determines by way of a common brake lever, such as a brake pedal, the proportions in the overall brake deceleration shared by the mechanical brakes and the electric brake.

3,731,169

DIGITAL SLIP FREQUENCY CONTROL CIRCUIT FOR ASYNCHRONOUS DYNAMO ELECTRIC MACHINES

Alwin Burgholte, 208 Pinneberg; Rainer Wirtz, 7141 Unteriexingen, and Helmut Domann, 725 Leonberg, all of Germany, assignors to Robert Bosch GmbH, Gerlingen-Schillerhohe Robert-Bosch-Platz, Germany

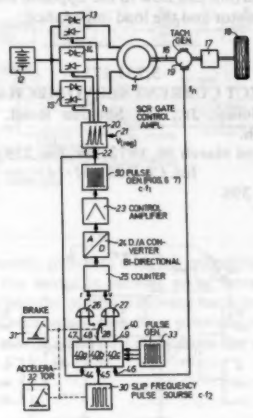
Filed March 24, 1972, Ser. No. 237,650

Claims priority, application Germany, April 24, 1971, P 21 20 193.4

Int. Cl. H02p *5/40*

U.S. Cl. 318—227 **14 Claims**

A control pulse generator is connected to control the gates of thyristor-type inverter circuits supplying an asynchronous dynamo electric machine with a-c power from a d-c source. The slip frequency is determined by a slip frequency pulse generator supplying pulses at a pulse repetition frequency (PRF) representative of a command value, in a feedback circuit including a tachometer generator supplying pulses at a PRF representative of speed of the machine; pulses are applied to a bi-directional counter, the count in the counter controlling the control pulse generator. To prevent simultaneous input to the forward and reverse terminals of the bi-directional counter, a clock pulse source of predetermined frequency



which is higher than the highest PRF expected is connected to a time-scanning and division network interconnecting the outputs of the various pulse sources and the counter so that pulses will be applied to the counter only as controlled by the clock pulse source. To enable the control pulse generator to have a wide range, for example between 50 to 30,000 Hz with controlled on-off ratio, a chopper applies positive and negative pulses to an integrator which is connected to a threshold amplifier, providing an output each time the threshold from the integrator is exceeded in either direction, the output controlling the operating rate of the chopper.

3,731,170

CIRCUIT FOR CONTROLLING THE DIRECTION OF CURRENT FLOW IN A LOAD IMPEDANCE

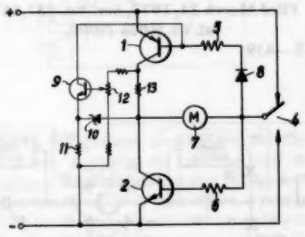
Reinhold Emmert, D-8510 Fuerth, Germany, assignor to Grundig EMV, Furth Bay Kurgartenstrasse, Germany

Filed June 19, 1972, Ser. No. 264,029

Claims priority, application Germany, June 22, 1971, P 21 30 847.4

Int. Cl. H02p *5/16*

U.S. Cl. 318—257 **5 Claims**



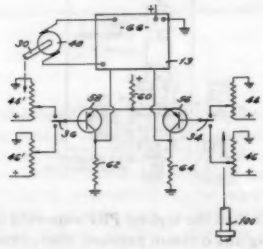
One terminal of a load impedance is connected to the collectors of two transistors of opposite conductivity type. Their emitters are connected to positive and negative power supply

terminals to receive direct current, and the emitter-collector circuits of the two transistors are in current-carrying polarity with respect to the direct current terminals. The bases of the two transistors are connected to the arm of a single-pole-double-throw switch. The fixed contacts of the switch are connected to the positive and negative power supply terminals so that in one position the base of one transistor is biased to conductivity to allow current to flow in one direction through the load impedance and the conductive transistor. When the switch is in the opposite position the other transistor is conductive and current can flow in the opposite direction through the latter transistor and the load impedance.

3,731,171
DIRECT CURRENT SERVO MECHANISM

George M. Holley, Jr., 510 Sheldon Road, Grosse Pointe Shores, Mich.

Filed March 30, 1972, Ser. No. 239,453
Int. Cl. G05b *11/14*
U.S. Cl. 318—396 12 Claims

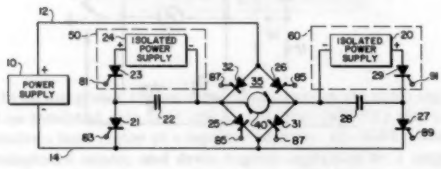


The control characteristics of potentiometers driven by the input and output shafts are compared and imbalance therebetween utilized to drive the output shaft motor in a direction to restore the balance. To avoid ambiguity in operation the potentiometers have an effective control characteristic range extending beyond 360° of shaft rotation to provide an overlap between the beginning and end of their ranges, which overlap is at least as great as the operational angular lag between the shafts. Means are provided for switching both potentiometers simultaneously from near the end of their ranges back to near the beginning of their ranges with such switchover occurring in the area of the overlap.

3,731,172
BIPOLAR SERVO AMPLIFIER COMMUTATION CIRCUIT USING A SEPARATE SILICON CONTROLLED RECTIFIER AND ISOLATED POWER SUPPLY FOR CHARGING A COMMUTATION CAPACITOR

Raymond H. Kaufman, El Paso, Tex., assignor to The United States of America as represented by the Secretary of the Army

Filed March 24, 1972, Ser. No. 237,667
Int. Cl. H02k *29/00*
U.S. Cl. 318—439 3 Claims

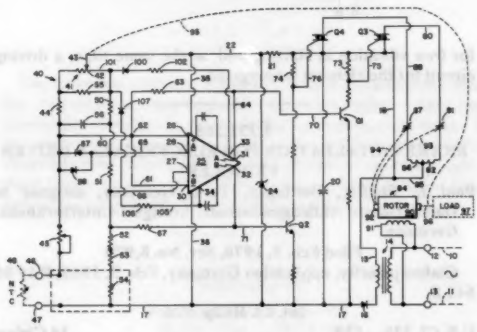


A direct current powered commutation and damping system for a servo motor having both forward and reverse direction commutation circuits that use silicon controlled rectifiers for control. A logic circuit with a plurality of sequentially timed outputs is used for controlling the period of the duty and the damping cycles. The damping cycle is on for about 5 percent of the entire system repetition period, and is specifically on during the off period of the motor power pulse.

3,731,173
CONDITION CONTROLLED REVERSIBLE MOTOR SYSTEM

B. Hubert Pinckaers, Edina, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed July 19, 1972, Ser. No. 273,245
Int. Cl. G05b *1/06*
U.S. Cl. 318—471 6 Claims

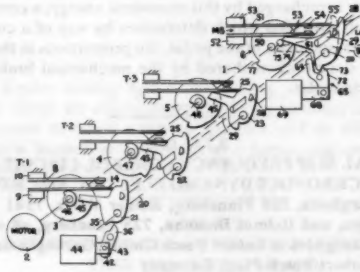


A condition controlled reversible motor system, disclosed as a temperature responsive system, operates to rebalance a bridge by means of a feedback potentiometer. The amplifier system connecting the bridge to the motor has a circuit means including a back biased diode that insures that the system always drives to a preferred or safe end in the event that the feedback potentiometer open-circuits or has a discontinuity between the wiper and the potentiometer resistor due to dirt or some other defect.

3,731,174
CONDITION CONTROL DEVICE AND SYSTEM

John L. Harris, 470 Palm Island, N. E., Clearwater, Fla.

Division of Ser. No. 133,236, April 12, 1971. This application Aug. 24, 1972, Ser. No. 283,273
Int. Cl. G05g *21/00*
U.S. Cl. 318—485 4 Claims



A timing device controls a group of electric heaters, turning them on in sequence in response to call for heat by a thermostat and turning them off in sequence when the call for heat is satisfied. The timer has two stopping points, one with the heaters off and the other with the heaters on. A single switch

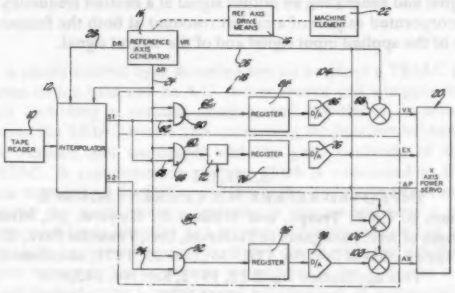
controls the timer motor and is opened by a timer cam at the off and on positions. The switch is held open at the off position by an off latch and at the on position by an on latch. These latches are released by a solenoid controlled by the room thermostat. The latches are also controlled by a timer cam, the off latch being held released when the timer is in the on position, and the on latch being held out at the off position. The load switches for the heaters are also opened instantly by a second solenoid responding to an unfavorable condition. This same action releases the on latch to cause the timer to return to the off position.

3,731,175

SERVO SYSTEM FOR VELOCITY AND POSITION CONTROL

Dudley B. Hartung, Somerville, Mass., assignor to Xerox Corporation, Waltham, Mass.

Filed March 6, 1972, Ser. No. 232,078
Int. Cl. G05b *19/24*
U.S. Cl. 318—570 **20 Claims**



An automatic control system in the form of a servomechanism is disclosed which is especially adapted for position and velocity control for machine tools. The invention provides increased accuracy and enables high speed operation by utilizing input command signals with the controlled axis variable expressed as a function of a reference axis variable. A signal processor operates on the command signal to produce control signals for the servo, such as position, velocity and acceleration signals. Preferably the command signals take the form of first and second difference signals and the necessary time base signal is supplied from a signal generator connected with the reference axis drive means so as to produce a velocity signal corresponding to motion with respect to the reference axis. The system is implemented in a manner to accept digital input signals from an interpolator or computer and to produce analog control signals for the servo.

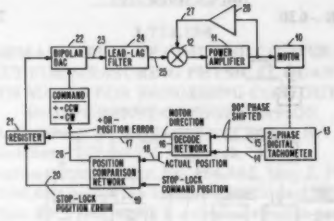
3,731,176

DECELERATION AND STOP-LOCK MOTOR CONTROL APPARATUS

John O. Mitchell, Longmont; Spencer D. Roberts, Broomfield, and Richard W. Van Pelt, Boulder, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed April 21, 1972, Ser. No. 246,213
Int. Cl. G09b *11/06*
U.S. Cl. 318—619 **20 Claims**

A motor, moving at a known speed, is stopped in a controlled manner by a speed control servomechanism which compares the actual speed-versus-distance deceleration profile to an optimum or desired speed-versus-distance deceleration profile, and variably controls the reverse energization, or plugging, of the motor in a manner devised to achieve the desired profile. When the speed servo has reduced motor speed to a low level, and preferably zero, a stop-lock control servomechanism is enabled to position and maintain the motor at a preselected stop-lock position. The stop-lock servo implements a motor-control algorithm which, for a



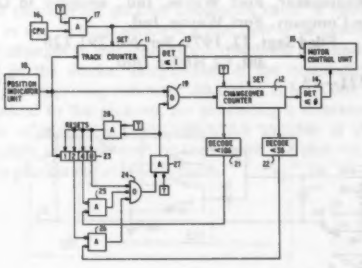
given position error, provides a higher magnitude motor energization when the motor is moving away from the stop-lock position than when the motor is moving back toward the stop-lock position. This control algorithm provides increased servo gain when the motor is moving away from the stop-lock position.

3,731,177

DISC FILE HEAD MOVEMENT CONTROL SYSTEM

Robert D. Commander, Eastleigh, England, and Jerry D. Dixon, Boca Raton, Fla., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 15, 1971, Ser. No. 208,150
Claims priority, application Great Britain, Feb. 15, 1971, 4,681/71
Int. Cl. G05b *19/28*
U.S. Cl. 318—603 **29 Claims**



According to the present invention a movement control system comprises a motor for moving said body into a required position, a motor control unit for controlling the acceleration and deceleration of said motor, a position indicator unit producing positioning signals corresponding to movement of said body while accelerating toward said required position, and a calculating unit responsive to position data representing said required position and to said positioning signals to produce a control signal for said motor control unit to change from acceleration to deceleration in order to provide required speed/position characteristics for the movement of said body.

3,731,178

PROCESS AND APPARATUS FOR EFFECTING CONTROL OVER CONTROL SYSTEMS FOR NON-LINEAR CONTROL PROCEDURES

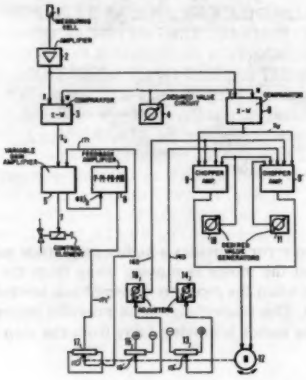
Manfred Schwanemann, Duesseldorf, Germany, assignor to Zellweger Ltd., Uster, Switzerland

Filed Jan. 27, 1971, Ser. No. 110,034

Claims priority, application Switzerland, Feb. 10, 1970, 1873/70

Int. Cl. G05b 5/01

U.S. Cl. 318—620 7 Claims



Process and apparatus for effecting control over control systems for non-linear control procedures wherein the amplification of the servo control amplifier in the main control system is adjusted in accordance with the control deviation by a secondary control system including a pair of chopper amplifiers responsive to the same input as the main control system for controlling a servo motor which drives respective feedback potentiometers controlling desired value generators connected to the respective chopper amplifiers and a control potentiometer for controlling the amplification of the servo control amplifier in the main control system.

3,731,179

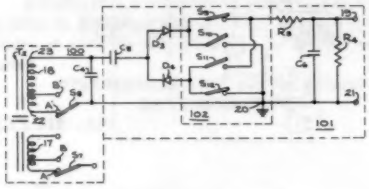
ADJUSTABLE HIGH VOLTAGE POWER SUPPLY WITH OUTPUT POLARITY SWITCHING

Leo C. Rademaker, Fort Wayne, Ind., assignor to General Electric Company, Fort Wayne, Ind.

Filed Sept. 22, 1972, Ser. No. 291,220

Int. Cl. H02m 7/00

U.S. Cl. 321—15 8 Claims



There is provided a high voltage power supply utilizing a high leakage reactance transformer connected to a voltage doubler which has a capability of reversing its output voltage. The power supply is of a type which may be used at several different input frequencies. There is provided an inexpensive low voltage switch connected to the secondary winding of the transformer and to ground. The low voltage switch is used to switch from one number of turns to another number of turns on the secondary winding depending on the frequency of the input signal.

3,731,180

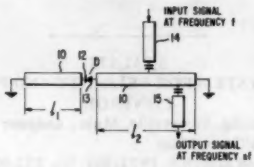
FREQUENCY TRANSLATOR CIRCUIT

Louis Sebastian Napoli, Hamilton, and John Joseph Hughes, Spotswood, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed March 13, 1972, Ser. No. 234,179

Int. Cl. H02m 5/30; H01p 3/08

U.S. Cl. 321—69 NL 8 Claims



The reactance of an active element exhibiting a nonlinear current-voltage characteristic in response to an applied input signal and generating an output signal at a desired frequency is incorporated as part of a circuit resonant at both the frequency of the applied input signal and of the output signal.

3,731,181

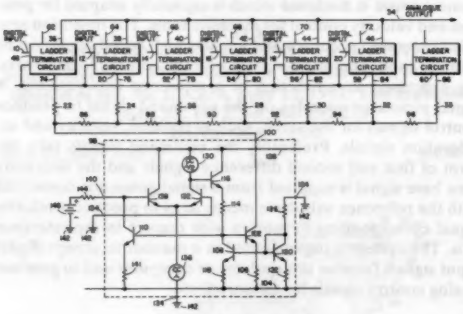
IMPROVED REFERENCE CURRENT SOURCE

James B. Cecil, Tempe, and William G. Howard, Jr., Mesa, both of Ariz., assignors to Motorola, Inc., Franklin Park, Ill.

Continuation of Ser. No. 110,936, Jan. 29, 1971, abandoned. This application April 12, 1972, Ser. No. 243,490

Int. Cl. G05f 1/56

U.S. Cl. 323—4 9 Claims



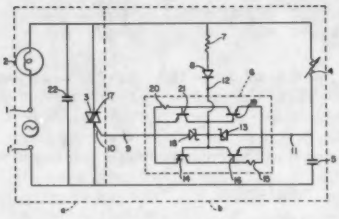
A digital to analog converter is supplied with operating current from a reference current source including an operational amplifier, across the input terminals of which are connected a reference voltage and a reference resistor in series. The output of the operational amplifier is fed back to the input by a reference transistor coupled between one of the input terminals and a source of potential. The current flowing through the reference transistor is established by the reference voltage and the reference resistor. The base of the reference transistor is coupled in common with the base of another transistor matched to it, so that the collector of such other transistor supplies the operating current to the digital to analog converter circuit.

3,731,182

PHASE CONTROL TYPE DIMMING SYSTEM WITH MEANS TO COMPENSATE FOR THE HYSTERESIS EFFECT

Akira Hirono, and Masayoshi Miyajima, both of Kyoto, Japan, assignors to Blackwell Electronics Ind. Co., Ltd., Kyota, Japan

Filed Nov. 3, 1971, Ser. No. 195,408
Claims priority, application Japan, Sept. 6, 1971, 46/68759; Sept. 6, 1971, 46/68760; Sept. 6, 1971, 46/68761
Int. Cl. G05f *3/04*
U.S. Cl. 323—19 **4 Claims**



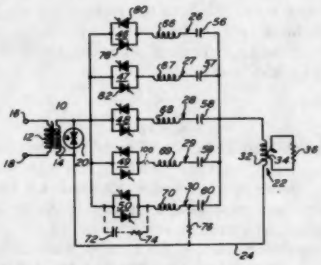
A phase control type dimming circuit employs a TRIAC in series with a load and an A.C. power source and a trigger circuit including a variable resistor and condenser in series across the TRIAC with a SBS connecting the junction between the resistor and condenser and the gate electrode of the TRIAC. A compensation circuit, which is connected to the gate terminal of the SBS to eliminate the hysteresis effect and extend the control range, includes in one embodiment a resistor and diode in series, in a second embodiment a pair of resistors in series and a pair of diodes connecting the junction point between the resistors to the anodes of the SBS, and in a third embodiment a resistor and a first diode in series and a pair of additional diodes connecting the junction between the resistor and the first diode to the anodes of the SBS. The third embodiment may be provided as a monolithic integrated circuit including the three diodes incorporated within the SBS.

3,731,183

POWER CONTROL AND PHASE ANGLE CORRECTING APPARATUS

Arthur C. Johnson, and Robert F. Herrman, both of Rancocas, N.J., assignors to Inductotherm Corporation, Rancocas, N.J.

Filed Sept. 29, 1971, Ser. No. 184,851
Int. Cl. H02p *13/16*; H02m *5/22*
U.S. Cl. 323—24 **7 Claims**



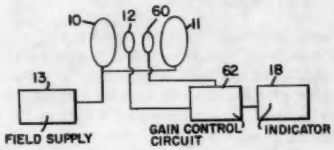
Apparatus for controlling power and for compensating for a low power factor due to a relatively large varying inductive load. A number of branches having an inverse parallel connected pair of thyristors and a capacitor connected in series are connected in parallel. These parallel branches are connected in series between an alternating current source and the load. At least one thyristor of one of the inverse parallel connected pairs of thyristors is gated on at some time during each half cycle of the alternating current supply voltage in order to control the power flow to the load. One thyristor of one or more of the inverse parallel pairs of thyristors is gated on at appropriate times during each half cycle in order to place one or more of the capacitors, which are in parallel with each other, in series between the source and the load.

3,731,184

DEFORMABLE PICK UP COIL AND COOPERATING MAGNET FOR MEASURING PHYSICAL QUANTITIES, WITH MEANS FOR RENDERING COIL OUTPUT INDEPENDENT OF ORIENTATION

Harold D. Goldberg, King Street, Port Chester, N.Y., and Milton I. Goldberg, Barrett Rd., Katonah, N.Y.

Continuation-in-part of Ser. No. 456,885, May 3, 1965, Pat. No. 3,560,845, which is a continuation-in-part of Ser. No. 4,766, Jan. 26, 1960, which is a continuation-in-part of Ser. Nos. 374,782, Aug. 17, 1953, abandoned, and Ser. No. 374,868, Aug. 18, 1953, Pat. No. 3,142,796, each is a continuation-in-part of Ser. No. 66,523, Dec. 21, 1948, Pat. No. 2,649,573. This application Nov. 24, 1970, Ser. No. 92,449
Int. Cl. G01r *33/00*
U.S. Cl. 324—34 R **19 Claims**



A device is disclosed for the measurement of cross-sectional area, volume, and related quantities, as well as physical quantities which can be transformed into area, volume, and the like, and mathematical functions of such quantities. It comprises a deformable pick-up conductor disposed in a magnetic field, which field may be produced externally, or by passing current through the pick-up conductor itself. A voltage is induced in the pick-up which is a function of its configuration, and of changes in this. Means are disclosed for rendering the output of the device independent of the orientation of the pick-up, comprising variously the use of at least one auxiliary coil, linked to the pick-up, for producing a reference signal, the use of magnetic fields which are capable of change in orientation and may scan or track with the pick-up, and the use of a plurality of magnetic fields.

3,731,185

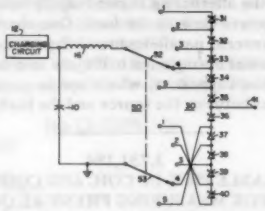
INSULATION TEST APPARATUS FOR THE HIGH FREQUENCY VOLTAGE DISCHARGE TYPE WITH IMPROVED SWITCHING ARRANGEMENT TO INITIATE DISCHARGE

Paul F. Pittman, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 24, 1971, Ser. No. 146,234
Int. Cl. G01r *31/14*
U.S. Cl. 324—54 **4 Claims**

An improved high frequency voltage test apparatus for insulated conductors is provided with a switching arrangement,

preferably utilizing solid state switching devices, particularly reverse switching rectifiers, with means to minimize the turn



on time of the switching devices and thus increase their life and reliability and also permit operaion of the apparatus over a wide voltage range.

3,731,186

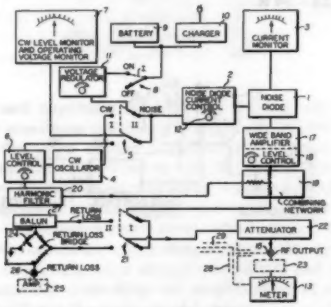
RADIO FREQUENCY MEASUREMENTS

Hans Sadel, 299 Park Avenue, Weehawken, N.J.

Filed June 1, 1971, Ser. No. 148,599

Int. Cl. G01r *17/04*

U.S. Cl. 324—57 N **4 Claims**



There is disclosed a method for determining the absolute response of a signal strength meter, or the absolute response of a device under test with the use of a previously calibrated signal strength meter. In the former case, a continuous wave signal of predetermined amplitude and frequency is applied to the input of the meter while it is tuned to the frequency of the continuous wave signal. A white noise signal is then applied to the input of the meter while it is tuned to the same frequency, and the level of the white noise signal is adjusted so that the meter reading is the same as the reading taken for the continuous wave signal. Thereafter, as the signal strength meter is tuned throughout the frequency range of interest, the absolute response of the signal strength meter can be determined by observing the meter reading even though the bandwidth of the filter of the meter may not be known. In a similar manner, a previously calibrated meter can be used to measure the absolute response of a device under test to whose input there are applied the white noise and continuous wave signals, and whose output is connected to the meter.

3,731,187

TEMPERATURE COMPENSATED FOULING MEASURING METHOD AND APPARATUS

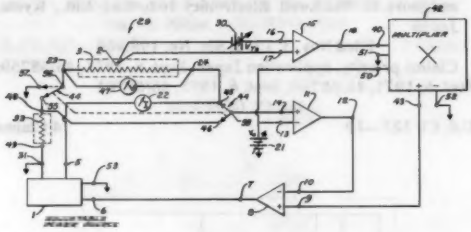
Rudolf H. Hausler, Rolling Meadows, and Robert W. Sampson, Arlington, both of Ill., assignors to Universal Oil Company, Des Plaines, Ill.

Filed Oct. 6, 1971, Ser. No. 186,888

Int. Cl. G01r *27/02*

U.S. Cl. 324—65 R **6 Claims**

An apparatus and method for measuring material buildup or fouling on a test specimen in which at least a portion of a temperature sensitive voltage output means is located proximate to a test specimen. The extent of fouling is determined by the change in current value or voltage value resulting from the change in the heat transfer coefficient of the test specimen.



The temperature sensitive voltage output means is at the same temperature as the temperature of the medium in which the test specimen resides and adjusts either the current value or voltage value to negate the effects of varying temperature of the medium on the other value across the test specimen.

3,731,188

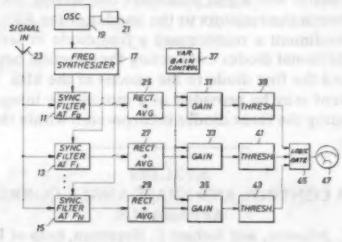
SIGNAL ANALYSIS OF MULTIPLICATIVELY RELATED FREQUENCY COMPONENTS IN A COMPLEX SIGNAL

Spurgeon E. Smith, Austin, Tex., assignor to Tracor, Inc., Austin, Tex.

Filed April 19, 1971, Ser. No. 135,090

Int. Cl. G01r *23/16*

U.S. Cl. 324—77 E **12 Claims**



Apparatus including a plurality of frequency-tunable filters controlled by a frequency synthesizer in turn controlled by a variable oscillator for examining a complex signal at frequency "bins" which are multiplicatively related, the amplitudes of the signals in these bins yielding quality information about the complex signal when compared to predetermined amounts known to be indicative of quality.

3,731,189

PULSE SAMPLING RESISTANCE METERING METHOD AND MEANS

Harold M. Sharaf, Milton, and Richard L. Eby, South Weymouth, both of Mass., assignors to Anderson Power Products, Inc., Brighton, Mass.

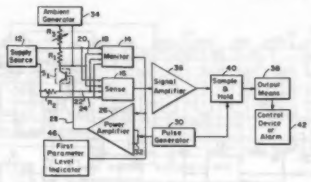
Division of Ser. No. 37,630, May 15, 1970, Pat. No. 3,676,770. This application May 18, 1972, Ser. No. 254,497

Int. Cl. G01r *27/02*

U.S. Cl. 324—62 R **18 Claims**

A continuously operating low dissipation system for sensing the electrical resistance of an element while the element carries a normal operating current. A pulse of electrical energy having a regulated first parameter is switched through the ele-

ment while a second parameter of the element's response to the energy pulse is simultaneously measured. These two known parameters provide the information necessary to determine the element's resistance using Ohm's law. The system is calibrated for the regulated level of the first parameter while the second parameter is amplified and stored in a sampling circuit for continuous display between pulses as an indication of



resistance. The pulse techniques of this disclosure allow continuous operation of the system without heating of the resistive element or excessive power use. The resistance indication is additionally useful for indicating the remaining charge in a battery where the indicated resistance is the battery's internal resistance. A distinct battery terminal voltage is also given.

3,731,190

SWITCHING CIRCUIT FOR MEASURING THE ELECTRICAL POWER IN TWO ENERGY FLOW DIRECTIONS (DELIVERED AND RETURNED)

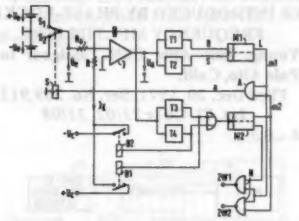
Manfred Schwendtner, Schwarzenbruck, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed June 12, 1972, Ser. No. 261,657

Claims priority, application Germany, June 11, 1971, P 21 28 883.5

Int. Cl. G01r *21/00*

U.S. Cl. 324—142 **3 Claims**



An electronic counter for measuring the electrical power in two energy flow directions (delivered and returned) is disclosed. The circuit comprises an integrator for the product of current and voltage, and a first pair of threshold circuits having a predetermined positive voltage threshold circuit and a predetermined negative voltage threshold circuit connected at their outputs to a bistable flip flop circuit. A second pair of threshold circuits, whose two predetermined threshold levels are higher than the threshold levels of the first pair of threshold circuits, is connected in parallel with the first pair of threshold circuits. An additional flip flop circuit is connected after this second threshold circuit. The outputs of the two flip flop circuits are connected via an exclusive OR circuit to the input of the integrator to change the polarity of the input signal in response to changes in direction of the power flow. Two counters are connected through a gate circuit to the outputs of the flip flop circuits to count signals proportional to the power and to feed the signal to one counter for energy flow in one direction and to the second counter for energy flow in the opposite direction.

3,731,191

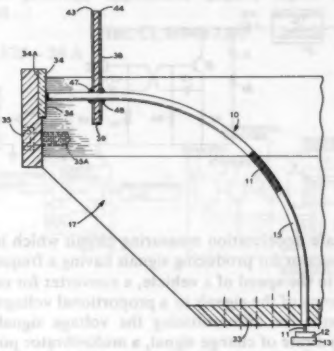
MICRO-MINIATURE PROBE ASSEMBLY

Robert L. Bullard, Poughkeepsie, and Donald C. Wheeler, LaGrangeville, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 22, 1969, Ser. No. 887,229

Int. Cl. G01r *31/02*

U.S. Cl. 324—158 F **1 Claim**



This invention is directed to a multi-probe test circuit assembly particularly adapted for producing low resistance electrical connections to a semi-conductor component of which the electrical parameters are to be evaluated.

3,731,192

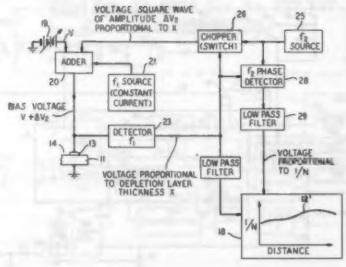
METHOD AND APPARATUS FOR ANALYZING SEMICONDUCTORS

Gabriel Lorimer Miller, Westfield, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed May 28, 1971, Ser. No. 147,846

Int. Cl. G01r *31/26*

U.S. Cl. 324—158 D **14 Claims**

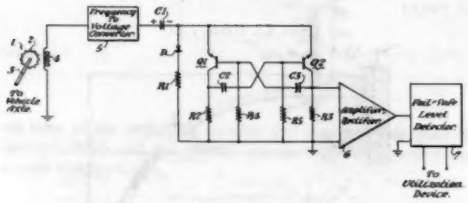


A semiconductor wafer is analyzed by applying successive values of reverse-bias voltage V to a diode region to form successive depletion layers of different depth X. Current of frequency f_1 is applied to the diode and detected to determine X. Voltage at frequency f_2, which is lower than f_1, is applied to the diode such as to produce a modulation ΔE_2 of the electric field in the depletion layer and a modulation ΔX_2 of the depletion layer depth. The voltage input at frequency f_2 is controlled to maintain either ΔE_2 or ΔX_2 constant with changes of X, and the modulation of the f_1 voltage at frequency f_2 is measured to determine one of these semiconductor parameters at different values of X. In this manner, a profile of semiconductor carrier density N, or its reciprocal 1/N, can be determined. An improved method of determining X is also disclosed.

3,731,193
VITAL VEHICLE BRAKE ASSURING CIRCUIT ARRANGEMENT

John O. G. Darrow, Murrysville, Pa., assignor to Westinghouse Air Brake Company, Swissvale, Pa.

Filed Feb. 16, 1971, Ser. No. 115,247
Int. Cl. G01p 3/42
U.S. Cl. 324—162 9 Claims

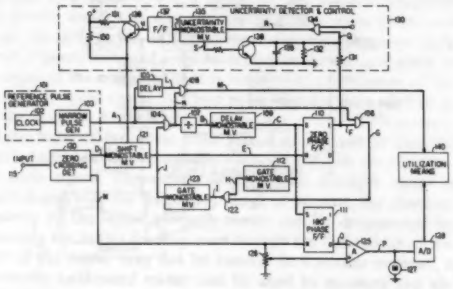


A fail-safe deceleration measuring circuit which includes a signal generator for producing signals having a frequency proportional to the speed of a vehicle, a converter for converting the frequency of the signals to a proportional voltage signal, a differentiator for differentiating the voltage signal and for producing a rate of change signal, a multivibrator powered by the rate of change signal for producing output signals proportional thereto, an amplifier-rectifier for amplifying and rectifying the output signals, and a level detector for measuring the amplitude of the amplified-rectified signals and energizing a utilization device when and only when the amplitude of the signals exceeds a predetermined level thereby signifying that the vehicle is decelerating at a sufficient rate.

3,731,194
AUTOMATIC TIME INTERVAL RANGING CIRCUIT FOR DELAY INTERVAL MEASUREMENTS INCLUDING UNCERTAINTY ELIMINATION

David Leonard Favin, Little Silver, and Paul Jerry Snyder, Linden, both of N.J., assignors to Bell Telephone Laboratories Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Nov. 10, 1971, Ser. No. 197,410
Int. Cl. G04f 9/00
U.S. Cl. 324—186 12 Claims

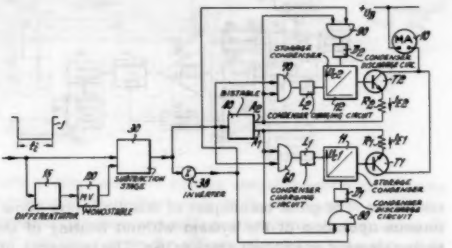


Delay time intervals are measured by employing a flip-flop circuit which is SET by a reference pulsating signal and RESET by a test pulse signal. A desired measurement precision is obtained by causing the flip-flop to be SET and RESET within the interval between adjacent pulses developed by a reference clock. This is achieved automatically by selectively shifting the phase of the reference pulsating signal waveform to delay SETTING of the flip-flop. The incremental shift in the reference signal waveform is directly related to the number of reference pulses occurring during the initial interval in which the flip-flop is SET and RESET. Uncertainty in automatic ranging is eliminated by selectively altering the pulse width of the test signal to assure that the flip-flop circuit is SET and RESET in a prescribed sequence.

3,731,195
PULSE DURATION MEASURING ARRANGEMENT

Wolf Wessel, Schwieberdingen, Germany, assignor to Robert Bosch GmbH, Gerlingen-Schillerhohe, Germany

Filed Oct. 4, 1971, Ser. No. 186,030
Claims priority, application Germany, Oct. 7, 1970, P 20 49 133.2
Int. Cl. G04f 9/00
U.S. Cl. 324—189 15 Claims

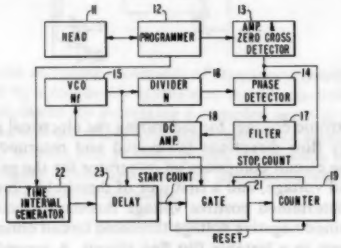


To convert the duration of single sequentially occurring pulses to proportional continuous current characteristic, for example voltage or current, a capacitor is charged by a constant current during the duration of the pulse, and condenser charge measured; to permit use of components in the circuit at operating points of their operating characteristics which exhibit sharp bends, rather than gradual transition, the charging of the condenser is delayed by a predetermined time period with respect to the start of the pulse to be measured, and, the capacitor is maintained at a predetermined initial charge corresponding to the charge which would otherwise accumulate during the delay period. Two capacitors, in two alternately activated channels are used to permit partial discharging, and recharging to a reciprocative level of one capacitor, while the other holds its previous charge for continuous indication of pulse length of the previous pulse.

3,731,196
METHOD AND APPARATUS FOR ELIMINATING COUNT SCATTER INTRODUCED BY PHASE-LOCKED LOOP FREQUENCY MULTIPLIERS

Byron A. Young, Palo Alto, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed Dec. 20, 1971, Ser. No. 209,912
Int. Cl. G01r 23/02, 33/08
U.S. Cl. 324—0.5 E 12 Claims



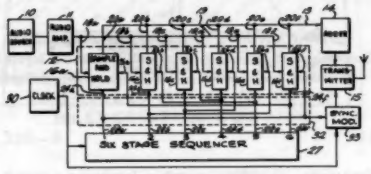
A frequency measuring system for use, for example, in an atomic resonance magnetometer device, comprising a phase-locked loop multiplier system to which the incoming AC signal is delivered including a voltage controlled oscillator having an operating frequency at a multiple of the frequency of the incoming signal, counter means being employed to count the cycles of the VCO signal output as a measure of the frequency of the incoming signal, the means for transmitting the VCO output signal to said counter means being synchronized with said incoming frequency signal to insure that the count is initiated at a predetermined point during the cycle of the incoming frequency signal.

3,731,197

SECRECY COMMUNICATION SYSTEM

John E. Clark, Ann Arbor, Mich., assignor to Ritt Laboratories, Inc., Ann Arbor, Mich.

Filed Dec. 15, 1969, Ser. No. 885,250
Int. Cl. H04k 1/00
U.S. Cl. 325—32 29 Claims



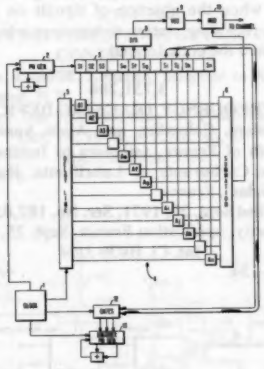
A secrecy communication system wherein an input signal is sampled at the encoder by electronic sample-and-hold circuits, each of which includes a capacitor to temporarily hold a sample. The input signal is sampled at contiguous intervals and at a rate selected according to the sampling theorem of at least twice the highest frequency component in the input signal. The samples are read from the capacitors in a rearranged abnormal order to obtain unintelligible secured signals. The decoder at a receiver essentially operates in a reverse sequence from the encoder to reconstruct the original input signal. The sample-and-hold circuits are arranged in groups so that while information is read into one group of capacitors, samples are simultaneously read from capacitors in another group.

3,731,198

SYNCHRONIZATION DEVICE FOR ANTI-JAMMING COMMUNICATIONS SYSTEM

Herman L. Blasbalg, Baltimore, Md., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 25, 1966, Ser. No. 575,501
Int. Cl. H04b 1/10; H04l 7/00
U.S. Cl. 325—42 7 Claims



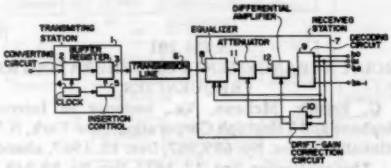
The invention is a synchronizing device for an anti-jam communications system producing at the transmitting station a synchronizing pulse formed by introducing a clock pulse into a matched filter pulse shaping network controlled by a shift register pseudo-noise sequence generator. At the receiving station a mirror image of the matched filter pulse shaping network is provided to decode the synchronizing pulse and eventually synchronize the clock at the receiving station.

3,731,199

MULTILEVEL SIGNAL TRANSMISSION SYSTEM

Kimio Tazaki; Hajime Yamamoto, both of Tokyo; Shigehiko Hinoshita, Yokohama, and Shoji Hagiwara, Tokyo, all of Japan, assignors to Nippon Telegraph & Telephone Public Corporation, Tokyo, Japan and Fijitsu Limited, Kawasaki, Japan

Filed April 18, 1972, Ser. No. 245,115
Claims priority, application Japan, April 30, 1971, 46/29081
Int. Cl. H04b 1/00
U.S. Cl. 325—38 A 11 Claims



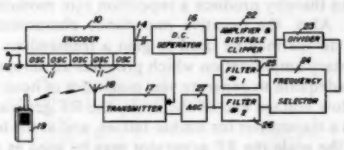
Apparatus for transmitting a signal in the form of a multilevel signal over a transmission line is disclosed in which a reference level signal having fewer levels than the multilevel signal and predetermined level values are inserted in a multilevel signal train with a predetermined period. On the receiving side of the transmission line, an error of the reference level signal from the aforesaid predetermined levels is detected, and gain and DC level adjusting devices supplied with the received multilevel signal are controlled based upon the detected error for correcting variations in the DC level and/or the gain of the transmission line.

3,731,200

SUBAUDIBLE REMOTE CONTROL TONE ENCODING SYSTEM

Robert J. Schwendeman, Pompano Beach; Thomas V. D'Amico, Fort Lauderdale, and Nicholas Petrakos, Plantation, all of Fla., assignors to Motorola, Inc., Franklin Park, Ill.

Filed Feb. 22, 1972, Ser. No. 227,747
Int. Cl. H04b 1/00
U.S. Cl. 325—55 19 Claims



A paging system includes a transmitter for transmitting a carrier frequency signal modulated by subaudible tone signals in response to audible tone signals coupled to the transmitter from a remote point. An encoder at the remote point develops the audible tone signals which are coupled to the transmitter over standard telephone channels. At the transmitter, a circuit converts the audible tone signals to first square wave signals having the same frequency as the audible tone signals. A divider circuit divides the first square wave signals by a particular number to develop second square wave signals having the same frequency as the desired subaudible tone signals. The second square wave signals are coupled to a low pass filter which attenuates all frequencies above the subaudible tone signal frequencies and develops a sine wave having the desired subaudible tone frequency.

A frequency selector circuit may also be employed and is coupled to the divider circuit. The frequency selector circuit is operative to select the second square wave signals having a frequency above a predetermined frequency and couple them to a first filter; and is further operative to select the second square wave signals having a frequency below a predetermined frequency and couple them to a second filter. The first and second filters have low pass attenuation characteristics and are operative to filter the square wave signals coupled thereto and develop the particular subaudible tone signals therefrom for modulating the transmitter RF carrier.

3,731,201

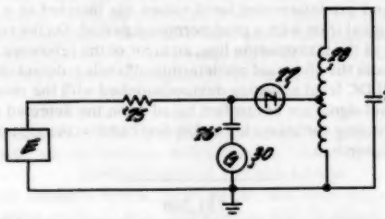
CIRCUIT ARRANGEMENT FOR GENERATING RADIO FREQUENCIES

Jack G. Frisbie, McLean, Va., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Continuation of Ser. No. 689,987, Dec. 12, 1967, abandoned. This application Nov. 12, 1970, Ser. No. 89,049

Int. Cl. H04b *1/04*

U.S. Cl. 325—105 **5 Claims**



The invention provides a general purpose RF oscillator which may have any of many uses, depending upon bias and voltage levels which may be used. An LC circuit is repeatedly triggered into self-damped bursts of RF oscillations responsive to a relaxation oscillator which is recurringly triggered by a negative impedance device. The time at which the relaxation oscillator is triggered may be varied as a function of an analog signal to thereby produce a repetition rate modulation of the analog. Also, the negative impedance characteristic of the trigger device may be used to gain a tremendous amount of momentary amplification which provides an amount of power that is adequate to generate vast quantities of heat. Therefore, at the low voltage end of the scale, the RF generator may be used as a transmitter for walkie-talkies, and at the high voltage end of the scale the RF generator may be used as an oven. In between these two ends of the scale, the generator has many other uses.

3,731,202

CRASH PAD CONTAINING A RADIO SHIELDING ELEMENT

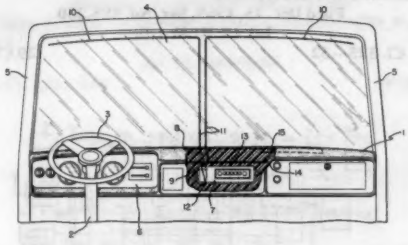
Dale J. Meyers, Logan, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed March 30, 1970, Ser. No. 23,672

Int. Cl. H04b *1/18*

U.S. Cl. 325—357 **3 Claims**

A crash pad which includes a decorative skin covering of a foam member and a reinforcing member adapted to permit a radio to be installed in the dash of a vehicle and a flexible



radio frequency shielding member having a ground connection.

3,731,203

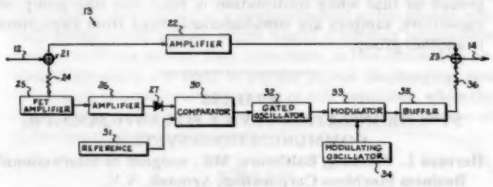
MONITORING CIRCUIT AND SYSTEM FOR DETECTING SIGNALS IN A SIGNAL TRANSMISSION SYSTEM

Daniel Lieberman, Seneca Falls, N.Y., assignor to GTE Sylvania Incorporated, Seneca Falls, N.Y.

Filed Sept. 25, 1970, Ser. No. 75,429

Int. Cl. H04b *3/46, 1/60;* **H04l** *25/28*

U.S. Cl. 325—363 **11 Claims**



A monitoring circuit which detects the presence or absence of signals on a signal transmission medium and generates a coded signal when the absence of signals is detected is shown. Also, a system utilizing a plurality of monitoring circuits is disclosed wherein each monitoring circuit generates a unique coded signal when the absence of signals on a cable is detected, and a receiving station determines which monitoring circuit generated the coded signal.

3,731,204

FREQUENCY TRACKING DEVICE

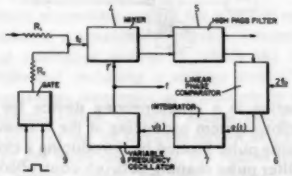
Robert Deligniers, Colombes, and Alain Ausset, Rueil-Malmaison, both of France, assignors to Institut Francais du Petrole des Carburants et Lubrifiants, Rueil-Malmaison (Hauts-de-Seine), France

Filed Sept. 20, 1971, Ser. No. 182,039

Claims priority, application France, Sept. 25, 1970, 7034947

Int. Cl. H03b *3/04*

U.S. Cl. 328—134 **2 Claims**



Frequency tracking device for determining the frequency shift between the predominant frequency of an input signal

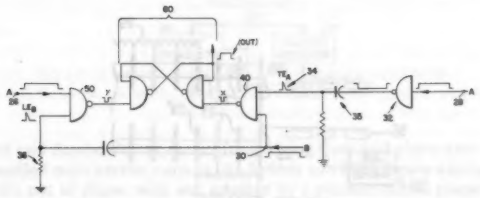
spectrum and a reference frequency, comprising means for generating a local signal of controlled frequency, means for producing a resultant signal at a frequency which is the sum of the respective frequencies of the input signal and the local signal and means for controlling the frequency of said local signal in response to the phase difference between the phase of said resultant signal and the phase of a signal at twice the reference frequency.

3,731,205

SEQUENCE DETECTOR CIRCUIT

Edward Boyd Gardner, Bloomfield, Conn., assignor to Emhart Corporation, Bloomfield, Conn.

Filed March 23, 1972, Ser. No. 237,367
Int. Cl. G01n *27/00*; G08b *13/16*
U.S. Cl. 328—5 **3 Claims**



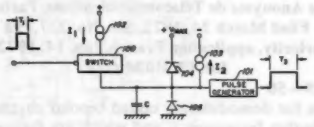
First and second longitudinally spaced photocell transducers are provided alongside a conveyor upon which articles are fed in sequence past these photocells, the spacing of the photocells being such that each is adapted to be located just inside the leading and trailing edges respectively of an article on the conveyor, each photocell is adapted to be activated in response to passage of the articles on the conveyor. Electric circuit means of the solid state type is adapted to accept sequential output signals from the photocells and to generate an output (OUT) pulse when the sequential photocell outputs bear a predetermined phase relationship to one another.

3,731,206

MULTIPLYING CIRCUIT WITH PULSE DURATION CONTROL MEANS

John R. Veale, London, England, assignor to Xerox Corporation, Rochester, N.Y.

Division of Ser. No. 731,857, May 24, 1968. This application Oct. 14, 1970, Ser. No. 80,707
Int. Cl. H03k *5/04*
U.S. Cl. 328—58 **2 Claims**



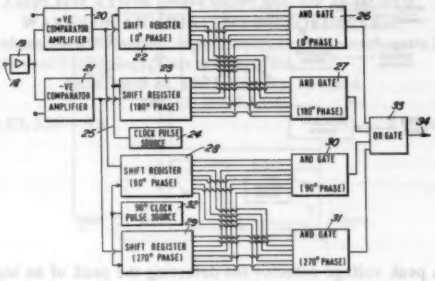
A multiplying circuit wherein a capacitor is charged at a constant rate for the duration of an input pulse and then discharged at another constant rate. The total of the charge and discharge times is a predetermined multiple of the input pulse duration. A pulse generator supplies an output pulse having a duration equal to the sum of the capacitor charge and discharge times.

3,731,207

SYSTEM FOR IDENTIFYING PHASE CODED GROUPS OF RADIO FREQUENCY SIGNALS

Brian Thomas Holyman, London, England, assignor to Decca Limited, London, England

Filed Aug. 30, 1971, Ser. No. 176,065
Claims priority, application Great Britain, Sept. 28, 1970, 46,115/70
Int. Cl. H03k *5/20*
U.S. Cl. 328—119 **9 Claims**



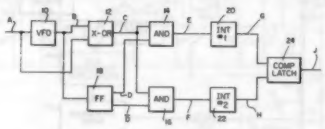
A system for identifying phase coded groups of radio frequency pulses. Two sampling means provide, at times corresponding to the interval between pulses, a single binary digital sample of the radio frequency signal and the complementary digit. Shift registers receive the sample and its complement respectively. AND circuits are coupled to mutually exclusive sets of stages of the shift register in order to detect the code characteristic of the desired group of pulses. The system is useful in Loran C receivers and otherwise.

3,731,208

APPARATUS FOR AND METHOD OF INTEGRATION DETECTION

Richard G. Laatt, Longmount, and Juan A. Rodriguez, Boulder, both of Colo., assignors to Storage Technology Corporation, Boulder, Colo.

Filed May 17, 1971, Ser. No. 144,085
Int. Cl. H03k *3/00*
U.S. Cl. 328—127 **8 Claims**

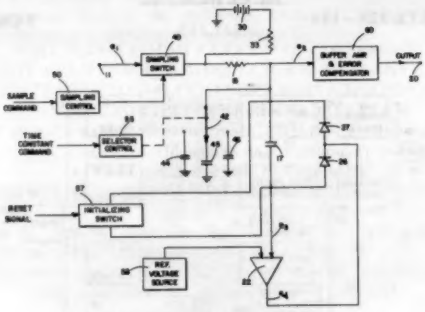


A variable frequency clock is slaved to phase encoded data arranged in sequential bit cells. The phase encoded data is then exclusively OR'ed with the output of the clock and applied to a pair of AND gates which are alternately enabled during successive bit cells. A pair of integrators operating in a differential mode and utilizing negative feedback are provided, one for the output of each AND gate, to alternately integrate successive bit cells. Since each integrator must only integrate over every other bit cell, ample squelch time is provided after each integration thereby assuring return to the squelch reference level.

3,731,209
PEAK VOLTAGE DETECTOR CIRCUIT

Richard Alan Satterfield, Huntington Beach, Calif., assignor to Northrop Corporation, Beverly Hills, Calif.

Filed May 15, 1972, Ser. No. 253,158
Int. Cl. H03r 5/00
U.S. Cl. 328—151 7 Claims

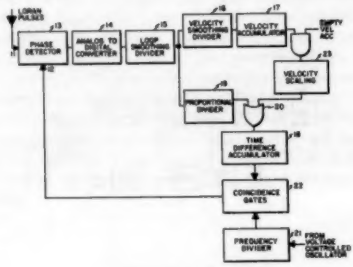


A peak voltage detector for detecting the peak of an input voltage and holding this peak value for a predetermined period of time includes a capacitive charging circuit for charging to the peak of the input voltage, a pair of series connected unidirectional electronic valve devices such as diodes connected across the capacitor, and an inverting amplifier, the input of which is connected to receive the voltage on one plate of the capacitor, the output of which is connected to the interconnection point between the electronic valve devices. The peak voltage is held on the capacitor be means of an amplifying feedback circuit provided by the inverting amplifier and the electronic valve devices.

3,731,210
REDUCTION OF TIMING RESOLUTION IN DIGITAL PHASE LOCK LOOPS

Leonard D. Mollod, New York, N.Y., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed May 4, 1972, Ser. No. 250,396
Int. Cl. H03b 3/00
U.S. Cl. 328—155 4 Claims

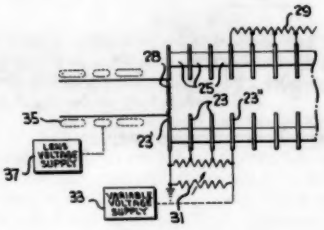


This invention relates to a method of reducing the timing resolution necessary to obtain a given level of phase measurement accuracy from a digital phase lock loop in a digital sample data system such as is used in radio navigation systems; i.e. Loran. The phase lock loop tracks and measures the phase of a preselected cycle of the Loran pulse by repetitively sampling the incoming RF and modifying the phase number used to generate a sampling strobe pulse. If and when the strobe pulse does not straddle the zero crossing, a persistent phase error is detected, converted to digital form, smoothed to reduce noise, and then used to update all binary bits of a phase number integrator. The phase number integrator is used to measure the phase and control the strobe time event. The lower order bits of the phase number integrator, corresponding to the phase increments which are too fine to effect accurate control of the strobe timing, are converted to an equivalent phase error and fed back and subtracted from the output of said phase error detector to cancel any phase error arising from the insufficient timing resolution of the strobe pulse.

3,731,211
PARTICLE ACCELERATION TUBE HAVING IMPROVED BEAM FOCUS CONTROL

Kenneth H. Purser, Honeoye, N.Y., assignor to Radiation Dynamics, Inc., Westbury, N.Y.

Filed Sept. 29, 1969, Ser. No. 861,554
Int. Cl. H01j 23/00, 23/34; H05h 7/00
U.S. Cl. 328—233 10 Claims



Improved focusing of a beam of charged particles is achieved in an acceleration tube comprising alternate insulating rings and apertured electrodes to which progressively increasing electric potentials are applied to create an electric field for accelerating the charged particles along the length of the tube. In order to achieve precise beam focusing for different electric field strengths the aperture of the grounded electrode at the tube entrance is covered with a grid-like structure and a variable control voltage is applied to a downstream control electrode. For different field strengths the control voltage is adjusted to modify the field between the grounded and control electrodes to provide a variable lens effect. A preferred embodiment employs a variable resistor connected between the grounded and control electrodes to provide the variable control voltage.

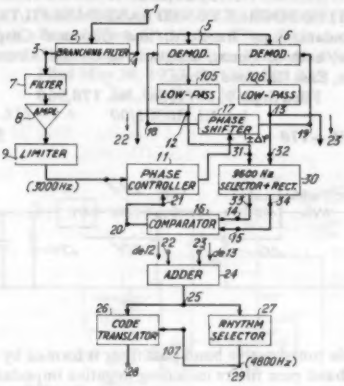
3,731,212
AUTOMATIC PHASE ADJUSTMENT SYSTEM FOR THE DEMODULATION OF SINGLE SIDEBAND TRANSMITTED CODED RHYTHMIC SIGNALS

Jacques B. Claisse, Paris; Moni S. Mitrani, La Varenne Saint-Maur, and Jean-Rene Berland, Paris, all of France, assignors to Societe Anonyme de Telecommunications, Paris, France

Filed March 24, 1972, Ser. No. 237,793
Claims priority, application France, Jan. 14, 1972, 7201315
Int. Cl. H03d 1/24
U.S. Cl. 329—50 8 Claims

A system for demodulating coded bipolar rhythmic signals having a rhythm frequency f_1 and which are frequency-transposed and single-sideband transmitted simultaneously with a carrier current of frequency f_o, said system comprising two balanced demodulators whose signal inputs receive said signals and whose control inputs are controlled by carrier currents having same said frequency f_o but which are out of phase with one another, said system comprising means for deriving from said transmitted carrier current a main carrier current of frequency f_o and means for additively combining the other signals delivered by said demodulators, said system being

characterized by means controlling the phase of said main carrier current, such means being controlled by a slowly varying control voltage obtained from the difference between the amplitude of two auxiliary signals having a frequency twice the rhythm frequency f_1 and obtained from the respective outputs



of said demodulators; means for deriving from said phase-controlled main carrier current two further carrier currents which are out of phase with one another by a predetermined phase angle, and means for applying said out-of-phase carrier currents to the respective control inputs of said demodulators.

3,731,213

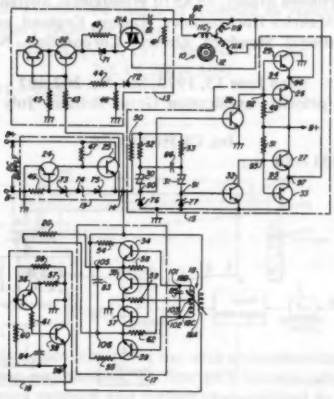
DIFFERENTIAL DEMODULATOR FOR RATE GYRO

John Van Dyke, Byron Center, and Benard Lamfers, Jenison, both of Mich., assignors to R. C. Allen Inc., Grand Rapids, Mich.

Division of Ser. No. 794,018, Jan. 27, 1969, Pat. No. 3,617,842. This application June 18, 1970, Ser. No. 47,523

Int. Cl. H03d 1/18

U.S. Cl. 329—166 **5 Claims**



An electrical control and indicator system for a rate gyro of the kind comprising a synchronous A.C. spin motor and a pick-off device for developing two A.C. turn rate analog signals, comprising a motor start control circuit for switching a starting capacitor into and out of the motor circuit in response to changes in the stator voltages. The system further includes an inverter power supply with driver and switch circuits to energize the motor from a D.C. source without appreciable loading of the inverter. The demodulator of the system, to which this application is directed, is a balanced differential rectifying amplifier comprising two cross-connected emitter follower stages each using a transistor as the load impedance for the emitter follower. The start control circuit, the inverter power supply, and the demodulator may all comprise a single non-inductive integrated silicon circuit.

3,731,214

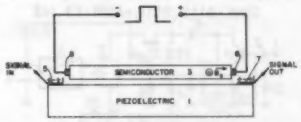
GENERATION OF WEAKLY DAMPED ELECTRON PLASMA SURFACE WAVES ON A SEMICONDUCTOR: AMPLIFICATION AND COUPLING OF ACOUSTIC WAVES ON AN ADJACENT PIEZOELECTRIC

Abraham Bers, Arlington, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed April 16, 1971, Ser. No. 134,854

Int. Cl. H03f 3/04

U.S. Cl. 330—5.5 **7 Claims**



Conduction electrons in a semiconductor which is subjected to an applied electric drift field and magnetic field are excited to give rise to a weakly damped electron plasma surface wave carrying negative or positive energy depending upon the direction of the applied magnetic field. Acoustic waves traveling along the surface of an adjacent piezoelectric are resonantly amplified and coupled to the electron surface waves.

3,731,215

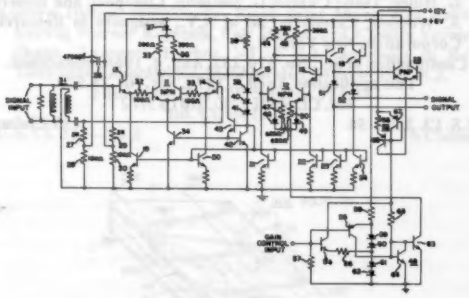
AMPLIFIER OF CONTROLLABLE GAIN

William Peil, North Syracuse, and Joseph P. Hesler, Liverpool, both of N.Y., assignors to General Electric Company, Syracuse, N.Y.

Filed Aug. 6, 1971, Ser. No. 169,642

Int. Cl. H03g 3/30

U.S. Cl. 330—29 **12 Claims**



An amplifier of controllable gain which is d.c. coupled throughout and capable of wide band operation is described. It employs a first and a second differential amplifier for producing the principal voltage gain of the amplifier. The differential amplifiers are interspersed with paired buffer amplifiers in emitter follower configuration, and a d.c. feedback path is provided to correct for any d.c. offset. Control of the gain of the first differential amplifier is implemented by an impedance connected in series with the base leads of the transistors and control of the collector emitter voltage to provide "forward" gain control operation. Control of the gain of

the second differential amplifier is implemented by control of the emitter currents and by insertion in the emitter leads of a nonlinear impedance comprising a diode and a shunt resistance. The amplifier is of high gain and wide bandwidth and is suitable for amplification at intermediate frequencies (44 megahertz) of a television signal. The gain control range equals the forward gain of the amplifier. The circuit is adapted for integrated circuit fabrication.

3,731,216

AUTOMATIC GAIN CONTROL CIRCUIT

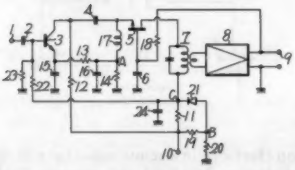
Hideo Nakamura, Chofu-shi, Kitatama-gun, Tokyo, and Kokichi Morii, Kita-ku, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 828,597, May 28, 1969, abandoned. This application June 23, 1971, Ser. No. 156,015

Claims priority, application Japan, May 31, 1968, 43/37154

Int. Cl. H03g *3/30*

U.S. Cl. 330—29 **10 Claims**



An automatic gain control amplifier has at least two amplifier stages forming a transmission line for an input signal with one of the stages constituted by a transistor and the other stage constituted by a field effect transistor. A reverse automatic gain control signal for the field effect transistor is derived from the output of the transmission line and a forward automatic gain control signal responsive to a current flowing through the field effect transistor is applied to the transistor, and improper bias of the transistor is suppressed so as to maintain the latter at its proper quiescent DC bias.

3,731,217

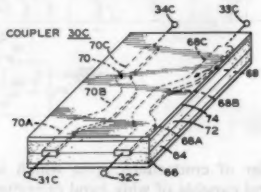
QUASI-OPTICAL SIGNAL PROCESSING UTILIZING HYBRID MATRICES

Carl W. Gerst, Skaneateles; Hugh A. Hair, Liverpool; Robert G. Hiller, Tully; Charles G. Simpson, Liverpool, and Robert A. Worden, Cazenovia, all of N.Y., assignors to Research Corporation, New York, N.Y.

Continuation of Ser. No. 570,232, Aug. 4, 1966, abandoned. This application April 3, 1970, Ser. No. 25,523

Int. Cl. H03f *3/60;* **H01p** *5/12*

U.S. Cl. 330—56 **17 Claims**



A microwave signal processing device comprises a first phase-transform matrix having a plurality of input ports and a plurality of output ports. Signals in a first domain applied to the input ports are power divided and phase coded upon transmission to the output ports. These signals at the output ports which have been transformed into a power distributed phase-coded domain are applied to the input ports of an operator matrix which changes the characteristics of the signals. The signals at the output ports of the operator matrix are applied to the input ports of a second phase-transform matrix which retransforms the signals to the first domain and transmits the retransformed signals from its output ports.

3,731,218

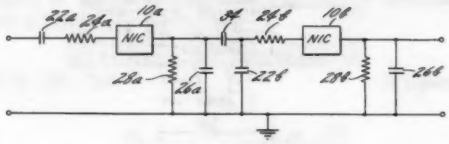
ACTIVE DOUBLE TUNED BAND PASS FILTER

John Saunders, East Hartford, and Clarence Casper, Jr., Windsor, both of Conn., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed Sept. 9, 1971, Ser. No. 178,960

Int. Cl. H03f *1/00*

U.S. Cl. 330—178 **5 Claims**



A double tuned active band pass filter is formed by utilizing a pair of band pass filters including negative impedance converter (NIC) circuits coupled with a pi-type or T-type capacitive coupling network, the capacitances of which provide the output capacitance of the first stage in the input capacitance of the second stage and a coupling capacitor. The first stage and the coupling capacitor form essentially a current generator allowing current mode operation of the second stage. In one mode, the coupling capacitor is chosen to be roughly two orders of magnitude less than the capacitors in the leg of the pi, the capacitances of which are the natural capacitances of the individual filter stage. In another mode, the coupling capacitor is made to be somewhere on the order of magnitude of the capacitance of the original devices, and the legs of the pi are adjusted to be equal to the value of the coupling capacitor divided by one plus the decimal fraction that the coupling capacitance bears to the basic capacitance. In a T-type configuration, greater, rather than lesser capacitance is used.

3,731,219

PHASE LOCKED LOOP

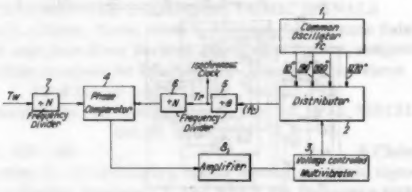
Heinz Bernhard Mader, ch 8570 Weinfelden, Switzerland, and Roger Maurice Hochreutiner, Harlow, England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed June 13, 1972, Ser. No. 262,402

Claims priority, application Great Britain, July 29, 1971, 35647/71

Int. Cl. H03b *3/04*

U.S. Cl. 331—14 **9 Claims**



A hybrid digital phase locked loop is disclosed to recover an isochronous clock from a "stuffed" multiplexed input signal as found in an asynchronous PCM demultiplexer. A low frequency voltage controlled multivibrator is controlled by the output of a phase comparator. The phase comparator is coupled to the input signal and the output signal of a distributor. The distributor is controlled by the multivibrator to sequentially switch a multiphase output signal of a crystal oscillator to pro-

vide the output signal of the distributor. This arrangement overcomes the requirement of a voltage controlled crystal oscillator per channel group in the demultiplexer.

3,731,220

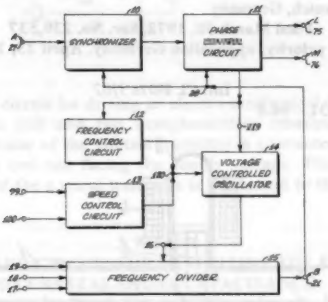
PHASE LOCKED OSCILLATOR FOR USE WITH VARIABLE SPEED DATA SOURCE

Edward R. Besenfelder, Oklahoma City, Okla., assignor to Honeywell Information Systems Inc., Waltham, Mass.

Filed May 30, 1972, Ser. No. 260,335

Int. Cl. H03b 3/04

U.S. Cl. 331—1 A **12 Claims**



Phase encoded data is retrieved from a magnetic tape or a magnetic disk and used to synchronize an oscillator with the data being read. The frequency of the oscillator can be synchronized over a wide range of frequencies. The basic frequency of the oscillator can be changed over a relatively wide range and the basic frequency can also be divided by 2, by 4 or by 8 so that a wide range of tape speeds may be used in a magnetic tape machine.

3,731,221

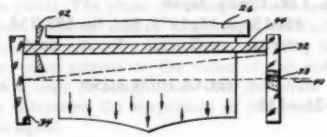
TUNABLE OPTICAL CAVITY FOR CHEMICAL LASER

Donald J. Spencer, Torrance; Donald A. Durran, Manhattan Beach, and Henry A. Bixler, Hawthorne, all of Calif., assignors to The United States of America as represented by the Secretary of the Air Force

Filed Aug. 10, 1971, Ser. No. 170,505

Int. Cl. H01s 3/08

U.S. Cl. 331—94.5 **2 Claims**



A tunable optical cavity for use with a chemical laser of the type utilizing a supersonic jet flow of a vibrationally excited gas as a lasing medium and further characterized by having a variable optically active dimension running transverse to the longitudinal axis of its optically active region. The tunable optical cavity is defined by a first laser mirror fixedly positioned on one side of the gas flow and characterized by having an optically flat mirror surface oriented parallel to the direction of the gas flow and a second laser mirror rotatably positioned on the other side of the gas flow and characterized by having a spherical shaped mirror surface oppositely disposed from the flat mirror surface.

3,731,222

PHENOXAZINE DYE LASERS

Karl H. Drexhage, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed March 30, 1972, Ser. No. 239,775

Int. Cl. H01s 3/20

U.S. Cl. 331—94.5 **12 Claims**

Phenoxazine dyes are useful as laser dyes. These dyes are used in solution with a non-interfering solvent to form lasing media useful in dye lasers. Such lasers generally include a reservoir for containing the laser dye solution and a pumping energy source operably associated therewith for producing stimulated emission of the laser dye solution.

3,731,223

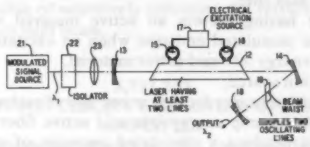
LASER APPARATUS FOR OPTICAL MODULATION TRANSFER

Wilbur Dexter Johnston, Jr., Holmdel, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 23, 1971, Ser. No. 183,076

Int. Cl. H01s 3/20, 3/10, 3/09

U.S. Cl. 331—94.5 **6 Claims**



There are disclosed arrangements for transferring optical information from one optical beam of a first frequency to another optical beam of a second frequency within a laser apparatus, particularly for the cases in which the laser transitions corresponding to the two frequencies are independent or very strongly competitive. The arrangements are based upon the use of a broadband gain medium, such as a dye laser medium, to modify the intensity relationship between two or more independent transitions or two or more competing transitions of a single laser medium.

3,731,224

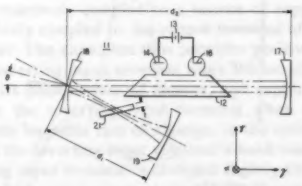
COMPENSATED FOLDED RESONATOR

Andrew Dienes, Middletown; Erich Peter Ippen, Red Bank; Herwig Werner Kogelnik, Fair Haven, and Charles Vernon Shank, Laurence Harbor, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 17, 1971, Ser. No. 154,087

Int. Cl. H01s 3/08

U.S. Cl. 331—94.5 **6 Claims**

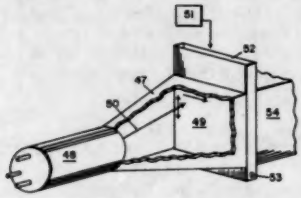


In a folded optical resonator, in one arm of which a Brewster element is located, the tilted reflector and the Brewster element both introduce astigmatism into the system, which gives rise to resonator instability. The astigmatic effects can be made to counteract each other to a large extent with resonator stability thereby assured if the several parameters of the system are properly related to each other according to an equation for stability.

3,731,225
FIBER OPTIC LASER SYSTEM

Norman R. Wild, Nashua, N.H., and Paul M. Leavy, Jr., Lynnfield, Mass., assignors to Sanders Associates, Inc., Nashua, N.H.

Filed April 2, 1962, Ser. No. 184,602
Int. Cl. H01s *3/00, 3/04, 3/09*
U.S. Cl. 331—94.5 P **14 Claims**



1. A fiber optic lasing system comprising an active fiber optic element,

said active fiber optic element having a core and a cladding around said core,

said core having therein an active material which will produce stimulated emission when an excitation source pumps energy into said active material,

an excitation source,

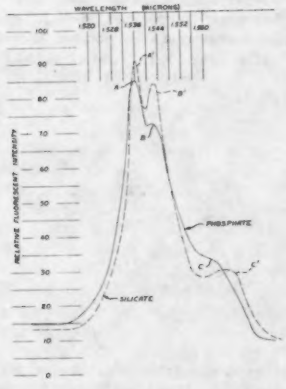
said excitation source located at one end of said active fiber element to pump energy into said active fiber optic element to produce a stimulated emission of said active material

said excitation source being in physical contact with said end of said fiber optic element.

3,731,226
LASER USING PHOSPHATE BASE LASER GLASS

Elias Snitzer, Wellesley, and Robert E. Graf, Southbridge, both of Mass., assignors to American Optical Corporation, Southbridge, Mass.

Continuation-in-part of Ser. No. 80,458, Oct. 13, 1970, abandoned, which is a continuation of Ser. No. 712,744, March 13, 1968, abandoned. This application Nov. 10, 1971, Ser. No. 197,394
Int. Cl. H01s *3/16*
U.S. Cl. 331—94.5 **5 Claims**

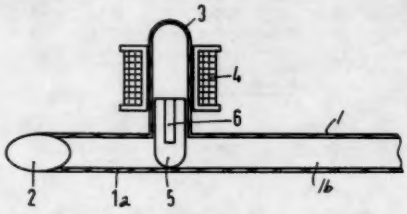


A laser device uses a material for incorporating into a glass laser host consisting essentially of a phosphate glass composed principally of an erbium metaphosphate admixed with an ytterbium metaphosphate. The properties of the glass may be varied by additional $R(PO_3)_3$ and $S(PO_3)_2$ contents wherein said R is a trivalent ion selected from the group consisting of aluminum, lanthanum, gadolinium, gallium, scandium, yttrium, neodymium, cerium, europium, manganese, molybdenum and chromium, and said S is a divalent ion selected from the group consisting of zinc, magnesium, cadmium, calcium, strontium or barium. The resulting glass composition provides a material capable of producing laser emission from the erbium ion at a wavelength of 1.536 microns, when disposed in a resonant cavity having an output reflector whose reflectance is a maximum of 80 percent.

3,731,227
GAS LASER

Dieter Rosenberger, and Alfred Hermann, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed March 30, 1972, Ser. No. 239,537
Claims priority, application Germany, April 23, 1971, P 21 19 948.4
Int. Cl. H01s *3/02*
U.S. Cl. 331—94.5 **9 Claims**

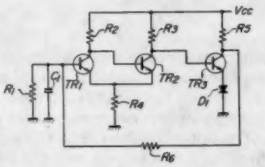


Condensation of metallic vapors on the cooler Brewster window ends of a laser tube during warm up and cool down periods are prevented by positioning a blocking member adjacent each end of the laser tube. The blocking members move from an operative position blocking the end of the laser tube to a position out of the path of the laser. In one embodiment the laser tube includes a lateral projection which receives the blocking member in its inoperative position. In another embodiment the blocking member is a curved disk having an outer diameter conforming to the cross sectional configuration of the tube and a transverse cross section generally conforming to the inner diameter of the laser tube.

3,731,228
OSCILLATING CIRCUIT

Noriyoshi Kubo; Kazuhiro Nakamura; Yoshinori Endo, all of Yokohama; Takeshi Katano, and Eisuke Ichinohe, both of Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Sept. 16, 1971, Ser. No. 181,034
Claims priority, application Japan, Sept. 18, 1970, 45/82356
Int. Cl. H03k *3/295*
U.S. Cl. 331—111 **1 Claim**



An oscillating circuit comprising a Schmitt circuit, a grounded capacitor connected to the input side of the Schmitt circuit and a control circuit connected to the output side of the Schmitt circuit for controlling the charging and discharging of the capacitor.

3,731,229

CIRCUIT ARRANGEMENT FOR MAINTAINING THE OSCILLATIONS OF AN ELECTRO-MECHANICAL OSCILLATOR

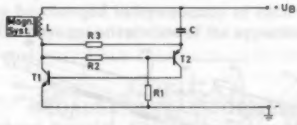
Hans Keller, Freiburg, Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Aug. 4, 1971, Ser. No. 169,015

Claims priority, application Germany, Aug. 22, 1970, P 20 41 827.3

Int. Cl. G04c *3/04*; H03b *5/30*

U.S. Cl. 331—116 M 1 Claim



This is a circuit for driving an electro-mechanical oscillator having one coil and two complementary transistors. The emitter resistor of the control transistor is connected to that end of the coil not facing the supply voltage. The emitter capacitor of the control transistor is connected to the supply voltage.

3,731,230

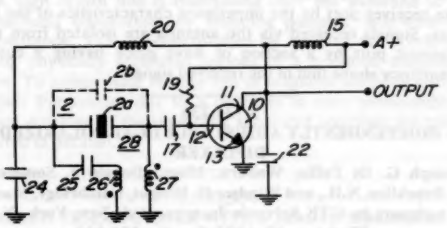
BROADBAND CIRCUIT FOR MINIMIZING THE EFFECTS OF CRYSTAL SHUNT CAPACITANCE

Frank J. Cerny, Jr., North Riverside, Ill., assignor to Motorola, Inc., Franklin Park, Ill.

Filed Dec. 17, 1971, Ser. No. 209,230

Int. Cl. H03b *5/36*

U.S. Cl. 331—116 R 2 Claims



A crystal controlled oscillator circuit having broadband circuitry for balancing out the effects of the static shunt capacitance of a crystal. A broadband phase inverting network is connected across the crystal to cancel the signal flowing through the crystal as a result of capacitive coupling between the plates. The phase inverting network may include a transformer, a center tapped inductor or a broadband inductance-capacitance network. A capacitor having a capacitance value related to the value of the static shunt capacitance is used in conjunction with the phase inverting network to determine the magnitude of the phase inverted cancellation signal.

3,731,231

ACOUSTO-OPTICAL MODULATOR SYSTEMS

Roger Torguet, Paris, France, assignor to Thomason-CSF, Paris, France

Filed April 20, 1971, Ser. No. 135,658

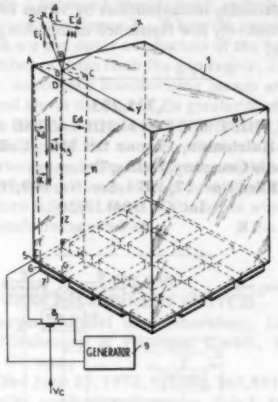
Claims priority, application France, April 24, 1970, 7015106

Int. Cl. H01s *3/10*

U.S. Cl. 332—7.51 9 Claims

The present invention relates to acousto-optical modulators systems which enable the luminous intensity of a beam of parallel coherent monochromatic light to be spatially modulated.

The modulator comprises a block of birefringent material and means for exciting therein a plurality of ultrasonic parallel



pencils capable of selectively reflecting the refracted portion of an incident light beam.

3,731,232

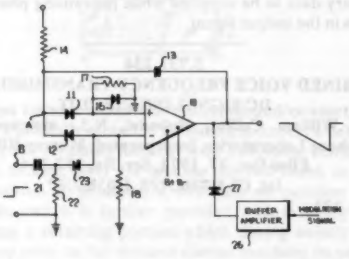
PHANTASTRON CIRCUIT EMPLOYING OPERATIONAL AMPLIFIER

Norris C. Hekimian, Rockville, Md., assignor to Hekimian Laboratories, Inc., Rockville, Md.

Filed July 13, 1971, Ser. No. 162,088

Int. Cl. H03c *1/06*

U.S. Cl. 332—31 R 9 Claims



A phantastron circuit includes an operational amplifier connected as an absolute value amplifier by connecting its inverting and non-inverting input terminals through respective oppositely poled diodes to a common input junction. The input junction is resistively coupled to a source of supply voltage and capacitively coupled to the output terminal of the operation amplifier. The capacitor thus provides positive feedback to the non-inverting input terminal when the amplifier output signal exhibits positive rate of change, and supplies negative feedback to the inverting input terminal when the output signal exhibits negative rate of change. In the quiescent state the diode at the inverting input terminal is back biased and the non-inverting input terminal is clamped slightly above ground to provide a high positive output signal from the amplifier. Application of a positive trigger to the inverting input terminal or a negative trigger to the non-inverting terminal produces a negative going step at the output terminal of the amplifier which, through the feedback capacitor, back biases the diode at the non-inverting terminal and forward biases the diode at the inverting input terminal to thereby create a negative feedback loop. The capacitor runs down linearly by means of a constant current delivered to the power supply resistively coupled to the common input junction. When the amplifier output

reaches a predetermined negative limit, the polarity of the rate of change reverts to positive, thereby reversing the bias on the input diodes and creating a positive feedback loop. Recovery time is substantially instantaneous by virtue of the feedback action and relatively low resistance in the charging circuit for the capacitor.

3,731,233

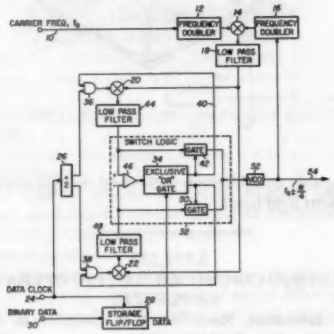
MINIMUM SHIFT KEYING MODULATING APPARATUS

William M. Hutchinson, Corona Del Mar, Calif., assignor to Collins Radio Company, Dallas, Tex.

Filed Nov. 17, 1971, Ser. No. 199,706

Int. Cl. H04l *27/20*

U.S. Cl. 332—9 R **8 Claims**



A minimum shift keying transmitter utilizing a voltage controlled oscillator and logic circuitry for altering the frequency output of the oscillator in accordance with the logic level of the binary data to be supplied while preventing phase discontinuities in the output signal.

3,731,234

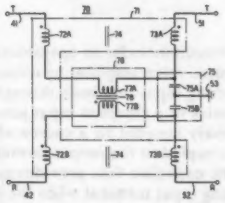
COMBINED VOICE FREQUENCY TRANSMISSION AND DC SIGNALING CIRCUIT

Russell William Collins, Holmdel, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 27, 1971, Ser. No. 212,364

Int. Cl. H04b *3/28*; H03h *7/42*

U.S. Cl. 333—1 **7 Claims**



A coupler exhibiting substantially improved insertion loss performance comprises a split winding transformer, an inductor network, and a capacitor network. The coupler longitudinally balances voiceband signals derived from a grounded source for transmission along a balanced cable pair and simultaneously provides metallic circuit continuity between the source and the cable pair for superimposed direct current (DC) and low frequency signaling. The transformer inductively transfers voiceband signals via its windings and, further, by having associated winding sections along the tip and ring connected series opposed, allows for the transfer of DC and low frequency signals without impairment of voiceband transmission. The inductor network provides metallic circuit continuity between the transformer windings to effect this transfer of DC and low frequency signals and, in addition, suppresses the longitudinal voiceband signal components.

3,731,235

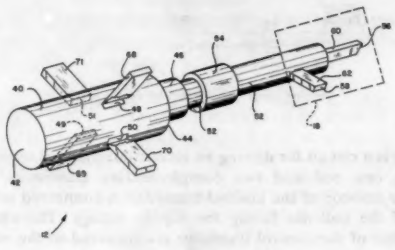
DUAL POLARIZED DIPLEXER

Joseph G. Ditullio, Woburn; Leonard I. Parad, Framingham, and Kenneth E. Story, North Reading, all of Mass., assignors to GTE Sylvania Incorporated, New York, N.Y.

Filed Nov. 3, 1971, Ser. No. 195,413

Int. Cl. H01p *5/12*; H04l *5/06*

U.S. Cl. 333—6 **7 Claims**



A microwave diplexer employs a section of circular waveguide having a transmit port coupled to two transmitters, an antenna port coupled to an antenna, and a receiver port including four openings symmetrically located around the periphery of the circular waveguide. Coupled to each receiver opening is a filter operative to improve the isolation between the receiver port and the transmit port for signals coming from the direction of the transmitter port. Two orthogonally related signals introduced at the transmit port are conducted along the circular waveguide to the antenna and are isolated from the receiver port by the impedance characteristics of the filters. Signals received via the antenna are isolated from the transmit port by a section of wave guide having a cutoff frequency above that of the received signal.

3,731,236

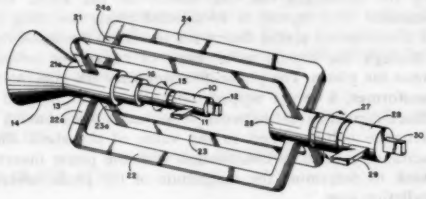
INDEPENDENTLY ADJUSTABLE DUAL POLARIZED DIPLEXER

Joseph G. Di Tullio, Woburn, Mass.; Donald J. Sommers, Brookline, N.H., and Windsor D. Wright, Cambridge, Mass., assignors to GTE Sylvania Incorporated, New York, N.Y.

Filed Aug. 17, 1972, Ser. No. 281,522

Int. Cl. H01p *5/12*

U.S. Cl. 333—9 **6 Claims**



Microwave diplexer apparatus for handling two independent polarized transmitted signals at one frequency and two independent received signals at a lower frequency. The two transmitted signals are introduced separately into a first two-port orthomode transducer so as to be mutually orthogonal. From the orthomode transducer they pass through a polarization rotator, which can be rotated to adjust their angle of polarization, to a first four-port orthomode transducer. The transmitted signals pass through an antenna port of the four-port orthomode transducer to the antenna. Received orthogonally polarized signals from the antenna pass into the four-port orthomode transducer. They are blocked from entering the first two-port orthomode transducer since they are below the cutoff frequency of that transmission path. They pass through four ports which are positioned orthogonally in

the four-port orthomode transducer. Filters at these ports prevent the high frequency transmitted signal from passing through. The received signals are conducted by four sections of rectangular waveguide to a second four-port orthomode transducer. The orthogonally polarized received signals pass through a polarization rotator to a second two-port orthomode transducer. When the rotator is properly oriented, the two polarized received signals are separately and independently coupled to two ports of the two-port orthomode transducer which are mutually orthogonal. By separately adjusting the angles of polarization by means of the two polarization rotators, the polarizations of the transmitted and received signals can be changed independently of each other without changing the physical orientation of the apparatus.

3,731,237

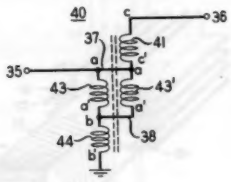
BROADBAND TRANSFORMERS

Henry Richard Beurrier, Chester Township, Morris County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 3, 1972, Ser. No. 223,117

Int. Cl. H03h *7/38, 13/00*

U.S. Cl. 333—24 R **4 Claims**



A high return loss is maintained over the passband of a broadband transformer by reducing parasitic interwinding capacitance. This is accomplished by locating the windings along physically separated regions of a common magnetic core. To compensate for any loss of magnetic coupling at the higher frequencies due to a decrease in core permeability, equal portions of the physically separated windings are connected in parallel.

3,731,238

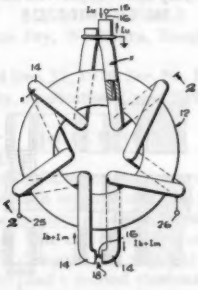
BALUN TRANSFORMER WITH A SINGLE MAGNETIC CORE AND IMPEDANCE TRANSFORMING MEANS

Edward M. T. Jones, Portola Valley, and Robert L. Tanner, Palo Alto, both of Calif., assignors to Technology for Communications International, Mountain View, Calif.

Filed Jan. 17, 1972, Ser. No. 218,139

Int. Cl. H03h *7/42, 7/38*

U.S. Cl. 333—26 **13 Claims**



Several embodiments of a high power wideband balun transformer are disclosed. In each embodiment a single high permeability magnetic core is incorporated. It is wound with a balun winding which converts an unbalanced impedance Z_U at unbalanced terminals to an equal balanced impedance across a gap region. Balanced terminals are connected to the gap region of the balun winding by impedance transforming means, so as to provide a balanced impedance Z_B which is not equal to the unbalanced impedance Z_U. When the impedance transforming means are the outer conductors of the balun winding a selected number of turns from the gap region, Z_B is less than Z_U. When the impedance transforming means are additional windings wound about the core Z_B is greater than Z_U, and the ratio Z_B/Z_U is a function of the number of turns N_x between the balanced terminals and the number of turns N_y of the balun winding. Apertures insulating boards are employed to control the spacings between the windings and the core, and the spacings between adjacent turns of the balun winding and the impedance transforming winding.

3,731,239

EXCESS CURRENT SWITCH

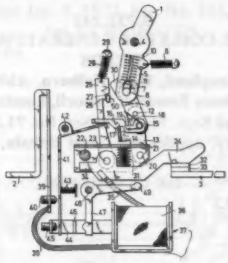
Jakob Ellenberger, Altdorf near Nuernberg, Germany, assignor to Ellenberger & Poensgen GmbH, Altdorf near Nuernberg, Germany

Filed June 23, 1972, Ser. No. 265,911

Claims priority, application Germany, July 1, 1971, P 02 13 273.8

Int. Cl. H01h *9/24*

U.S. Cl. 335—167 **7 Claims**



An excess current switch has a thermal and/or electromagnetic trip, a pivotally mounted actuating member, a bell crank connecting the actuating member with a movable contact carrier and a locking lever for locking the bell crank in an extended position to establish a switched on position of the switch. The switch is further provided with a spring biased latch having a retaining portion which during switch on engages a stop prior to the contact carrier reaching its switched on position. The latch is subsequently disengaged from the stop by an arm of the actuating member to allow the contact carrier to move to its switched on position. When a thermal and/or electromagnetic trip occurs a release lever actuates the locking lever to move it to a release position to thereby allow the bell crank to assume its switched off position and thus allow the switch to break. Such a switch provides for instantaneous switch on and off which results in a lengthening of the life of the contacts of the switch.

3,731,240

SWITCHING RELAY WITH A MAKE-AND-BREAK CONTACT MEMBER

Hans Peter Meyer, 8500 Nurnberg, Germany, assignor to International Standard Electric Corporation, New York, N.Y.

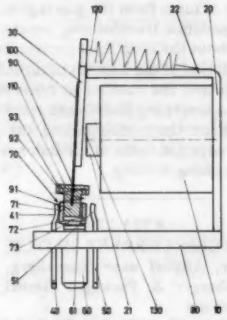
Filed Dec. 23, 1971, Ser. No. 211,518

Int. Cl. H01h *1/18*

U.S. Cl. 335—196 **13 Claims**

Switching relay with an electromagnet actuating an armature which armature actuates a contact member acting as bridging contact which in two end positions electrically connects to one another the center one and one of the outer ones of three stationary contact members arranged next to each other, the contact member consisting of a cup of contact

material elastically connected with the said armature, the center one of the stationary contacts being arranged so that the bottom of the said cup is in slidable contact with the said stationary center contact, the two other stationary contacts



being arranged so that the side wall of the said cup is in contact with one of the said stationary contacts in the end positions of the said cup contacting at the same time the said stationary center contact.

3,731,241

ELECTRICAL COILS FOR GENERATING MAGNETIC FIELDS

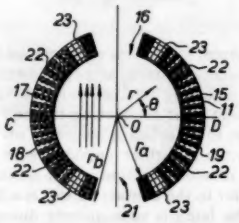
John Herbert Coupland, High Holburn, Abingdon, England, assignor to Science Research Council, London, England

Filed Sept. 11, 1970, Ser. No. 71,590

Claims priority, application Great Britain, Sept. 18, 1969, 46,172/69

Int. Cl. H01f *5/00*

U.S. Cl. 335—213 **10 Claims**



A novel approach to the mathematical analysis of the magnetic field produced by the coil windings of accelerator beam bending/focussing magnets has led to the proposal for inserting accurately located and dimensioned azimuthal spaces in the windings. The spaces provide a simple means for improving the uniformity of the magnetic field. A mathematically specified pattern of end winding reduces their disturbing influence.

3,731,242

METHOD OF FORMING PLURAL STRIP-SHAPED MAGNETIC POLES

Wytze Hofman, Emmasingel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 23, 1971, Ser. No. 173,904

Claims priority, application Netherlands, Aug. 31, 1970, 7012889

Int. Cl. H01f *13/00*

U.S. Cl. 335—284 **8 Claims**

To form strip-shaped poles in a preferably resilient magnet an electric conductor is provided in the direction of current flow with a plurality of parallel soft-iron strips on which the object to be magnetized is placed. A current pulse is passed through the conductor; the resulting magnetic field is highly directed by the strips. The device by means of which this

method may be carried out is very simple and may comprise a hollow conductor on the inner or outer surface of which the strips are arranged.

3,731,243

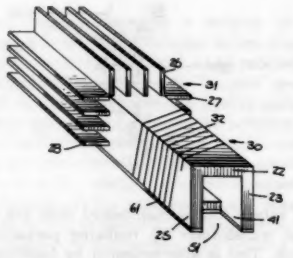
INDUCTIVE WINDING

Ariel R. Davis, 3476 Fleetwood Drive, Salt Lake City, Utah

Continuation of Ser. No. 99,132, Dec. 11, 1970, abandoned. This application Dec. 8, 1971, Ser. No. 206,048

Int. Cl. H01f *27/08, 27/28*

U.S. Cl. 336—61 **19 Claims**



A tubular aluminum member is extruded in a rectangular shape and cut to a given length. The four walls of the tubular member are successively cut by a circular saw to form a portion of the tubular member into a generally spiral shape winding with terminal portions at each end. The member is treated to form an insulating layer on the surfaces of the member including the facing sides of the winding to form an inductive winding for passing current. The winding may be compressed and one set of edges treated for engagement by current taps to produce a variable voltage and current device.

3,731,244

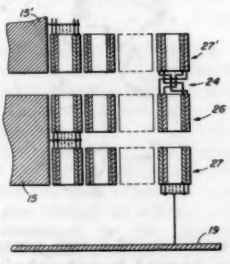
TRANSPOSITION OF INSULATING CORE WINDINGS

Byron L. Johnson, Westboro, Mass., assignor to High Voltage Power Corporation, Westboro, Mass.

Filed July 3, 1972, Ser. No. 268,761

Int. Cl. H01f *27/28*

U.S. Cl. 336—187 **6 Claims**



A device for reducing the incidence of circulating currents within the coil structure of multiple-conductor windings of

transformer/reactors of the insulating magnetic core type, by a transposition of the electrical connections between the several conductors of the multiple-conductor winding at the outer part of the winding after the core and coil assembly is completed. When effecting the necessary electrical connections between adjacent outer layers of winding, connections between analogous conductors of the multiple-conductor bundle are interchanged, the outermost conductor of one bundle being connected to the innermost conductor of the other bundle, second-outermost conductor of the one bundle being connected to the second-innermost conductor of the other bundle, and so forth.

3,731,245

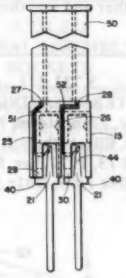
INDUCTOR BOBBIN WITH TERMINALS

Victor Oscar Roslin, Islington, Ontario, Canada, assignor to Northern Electric Company Limited, Montreal, Quebec, Canada

Filed Dec. 21, 1971, Ser. No. 210,441

Int. Cl. H01f *15/10*

U.S. Cl. 336—192 **1 Claim**



Coil winding form in which the flange at one end of the body portion has an extension. In the arrangement described the extension extends away from the body portion, but in line with it. Slots in the end of the extension remote from the body portion receive terminals which are pushed in and gripped by the slot sides. Grooves are formed up the flange face and along the surface of the extension, the ends of the grooves adjacent to the terminal slots connected to these slots by transverse passages. In position the tab of each terminal can extend upward from the slot, clear of the surface of the extension for soldering of the wire lead from the coil. On pushing the tap down the wire is not stretched as it passed along the grooves, through the transverse passages to the slots adjacent the position for attachment to the tab. No stresses are caused in the wire, nor is it pushed against the turns of wire in the coil.

3,731,246

IGNITION COILS

William Lawrence Fry, Woollahra, Haughton, Staffordshire, England

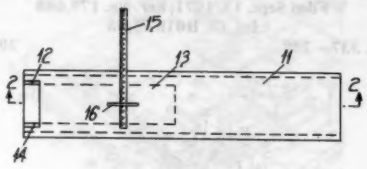
Filed Dec. 31, 1970, Ser. No. 103,126

Claims priority, application Great Britain, Dec. 3, 1970, 52,124/70

Int. Cl. H01f *15/10*

U.S. Cl. 336—192 **5 Claims**

A method of manufacturing ignition coils, and a former assembly for use in such manufacture, the former assembly including a hollow insulating former having a first conductor positioned therein. One end of the first conductor projects at one end outwardly beyond the adjacent end surface of one end of the former, and a second electrical conductor is positioned on the outer surface of the former. The first and second conductors are electrically interconnected by means of a conductive fastening device which also secures the first and second conductors to the former. The method includes the step of manufacturing the assembly, and inserting a core into the former from said one end of the former so that the core engages the first conductor. A wire is connected to the second conductor, so that the wire is connected to the core through



the first and second conductors and the fastening device. The wire is then wound on to the former to constitute a winding of the ignition coil.

3,731,247

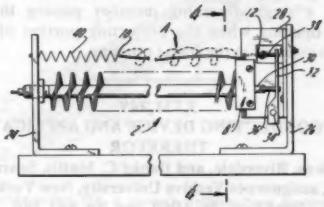
HIGH TEMPERATURE SENSING APPARATUS EFFECTIVE OVER EXTENSIVE LENGTHS

Robert N. Levinn, Catskill, N.Y., assignor to American Thermostat Corporation, South Cairo, N.Y.

Filed Jan. 8, 1971, Ser. No. 104,989

Int. Cl. H01h *61/06*

U.S. Cl. 337—140 **9 Claims**

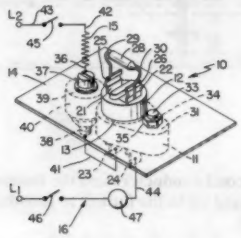


In order to sense the presence of excessively high temperatures at points along an extended length, an elongated element is extended along that length in heat-transfer relationship to the area where temperature is to be sensed, that element being formed of a material having a "memory" which is actuated when the material is subjected to the predetermined excessive temperature, that "memory" causing the material then to change its shape and therefore alter the effective length of the element. Work means is operatively connected to that element, the work means performing a function appropriate to the sensing of the excessive temperature. That function may, for example, be the opening of a circuit to a heater, the sounding of an alarm, or the actuation of fire extinguishing apparatus. Because of the characteristics of the material of which the elongated element is formed, it is essentially inactive over a range of temperatures below the predetermined excessive temperature, and becomes operatively active only when that predetermined excessive temperature is reached. The arrangement in question is particularly well adapted for use in conjunction with elongated baseboard heaters the heating action of which is normally controlled by a room thermostat located remotely from the heater. The apparatus of the present invention will determine whether sections of the heater become heated to excessive temperatures even though the room being heated may not be at an excessive temperature.

3,731,248
THERMAL LIMITER CONSTRUCTIONS

Emil Robert Plasko, Washington Township, Montgomery County; James Allen Kohl, Kettering, and Michael Raymond Hutchison, Wayne Township, Montgomery County, all of Ohio, assignors to Micro Devices Corp., Dayton, Ohio

Filed Sept. 13, 1971, Ser. No. 179,688
Int. Cl. H01h *85/48*
U.S. Cl. 337—208 20 Claims

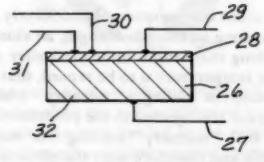


A thermal limiter construction for at least one electrical circuit comprising a body member of electrical insulating material having a reduced portion projecting therefrom and adapted for insertion in an opening of a frame while the body member is adapted to abut one side of the frame outboard of the opening. A pair of leads are carried by the body member and project from the body member remote from the projecting portion thereof for lead attachment thereto. A thermally responsive fuse is carried by the reduced projecting portion and is interconnected in series with the leads. Either the body member or one of the leads has a single fastening opening passing therethrough adapted to fasten the body member to the frame solely by a single fastening member passing through the fastening opening when the projecting portion of the body member is inserted in the frame opening.

3,731,249
POLYCONDUCTING DEVICE AND APPLICATIONS THEREFOR

Max Lipsicas, Riverdale, and Daniel C. Mattis, Scarsdale, both of N.Y., assignors to Yeshiva University, New York, N.Y.

Filed Sept. 26, 1969, Ser. No. 861,380
Int. Cl. H01c *1/14*
U.S. Cl. 338—325 2 Claims



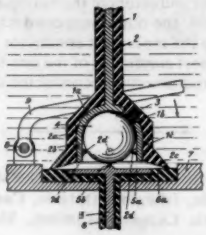
A polyconducting device, both two terminal and three terminal, is shown which includes a metallic oxide or metallic salt and conducting members operatively connected thereto. Various applications of the device, including use as an oscillator, a gated oscillator and a modulation device are also shown.

3,731,250
METHOD OF MAKING ELECTRICAL CONNECTORS AND CONNECTORS THEREFOR

Philippe J. F. Bonnamy, 92 Boulogne, Billancourt, France, assignor to Compagnie Francaise Des Petroles, Paris, France

Filed Nov. 30, 1971, Ser. No. 203,173
Claims priority, application France, Nov. 30, 1970, 7042940
Int. Cl. H01r *11/30*
U.S. Cl. 339—12 V 22 Claims

A method of obtaining an electrical connection underwater and connectors for carrying out the method, without requiring precise alignment of the connectors by employing a breakable rigid container filled with gas at a reduced pressure within a sealable waterproof housing surrounding the metal contact of a movable connector. The contact of the movable connector is engaged with a metal contact of a stationary connector and

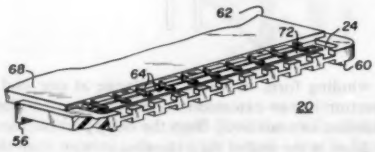


the breakable envelope is broken, causing a reduction in the pressure within the waterproof housing to remove any water from between the metal contacts and retain the metal contacts in contact with each other and seal them from the surrounding environment.

3,731,251
MEANS FOR TERMINATING FLAT CABLE

William Young Sinclair, Frenchtown, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Filed April 13, 1972, Ser. No. 243,635
Int. Cl. H05k *1/06*; H01r *3/06, 31/08*
U.S. Cl. 339—17 F 15 Claims



Novel means for terminating flat cable comprising a flat, elongate base member selectively apertured to provide an access way between a pair of conductor receiving portions disposed on opposing surfaces of the base member, wherein selective conductors of the flat cable may be disposed adjacent one or the other of said conductor receiving portions and connected to a selectively formed terminal positionable within an associated terminal receiving recess in said conductor receiving portions, affording additional separation between adjacent conductors. In a further embodiment coupling means are provided to permit the interconnection of a plurality of conductors to one or more metallic strips interposed within one of the conductor receiving portions to provide a common termination point therefore. A suitably formed enclosure which may be provided with spaced ribs for receiving a portion of the terminals affixed to the base member may be employed to provide an enclosed assembly. The base member further includes a cable receiving portion adapted to provide a support for a selective portion of the flat cable.

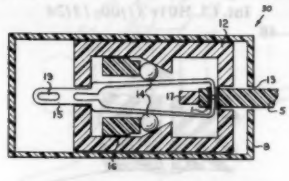
3,731,252
PRINTED CIRCUIT BOARD CONNECTOR

James E. McKeown, and Donald E. Michel, Sidney, both of N.Y., assignors to The Bendix Corporation, Southfield, Mich.

Filed March 22, 1971, Ser. No. 126,801
Int. Cl. H05k *1/04*
U.S. Cl. 339—17 L 8 Claims

A circuit board having metal eyelets in one end thereof that are the terminals of the electrical circuit on the board is mated with a connector that has a plurality of pairs of male members that are aligned with and pass into the eyelet holes in the cir-

cuit board. When the circuit board is inserted into the connector, the male members enter both sides of the holes in the circuit board and, by action of the planar surfaces of the end portions of opposing male members, the male members are forced into pressure contact with the inner wall of the holes thereby completing the electrical circuit between the connector and the circuit board.



3,731,253

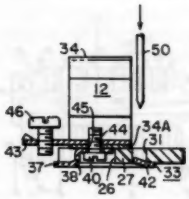
SNAP-ON TERMINAL ASSEMBLY FOR METER SOCKETS

William F. Coffey, Stratford, Conn., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 3, 1972, Ser. No. 223,155

Int. Cl. H01r *9/08*

U.S. Cl. 339—217 S **7 Claims**



A snap-on terminal assembly for a meter socket includes a retaining clip fastened to the bottom of an auxiliary jaw terminal. The retaining clip includes a flat base with an offset cantilever projection for supporting the auxiliary jaw terminal above the base. An integral tab on the base projects toward the free end of the cantilever projection. The retaining clip holds the auxiliary jaw terminal in a clamped relationship on the face of the meter socket base when the retaining clip base is positioned on the back of the meter socket base and the tab is received by a meter socket hole.

3,731,254

JUMPER FOR INTERCONNECTING DUAL-IN-LINE SOCKETS

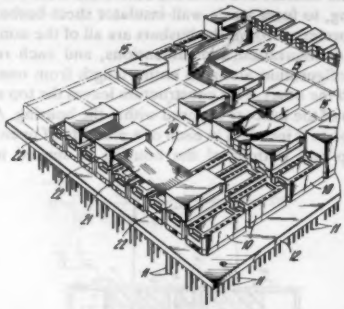
Edward H. Key, Doylestown, Pa., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Filed Aug. 2, 1971, Ser. No. 168,257

Int. Cl. H01r *11/04*; H05k *1/04*

U.S. Cl. 339—17 CF **9 Claims**

A jumper for interconnecting the leads of dual-in-line sockets mounted on a panel board comprises the combination of a flat multi-conductor cable terminated at its opposite ends with a connecter, each connecter including a housing having a plurality of terminals which extend from the lower portion of the base for connection to the dual-in-line socket, while the upper portion of the terminals are disposed in the housing and respectively connected to the conductors of the flat multi-conductor cable. The arrangement of the terminals in the housing enables the conductors of the flat multi-conductor cable to be mass bonded to the terminals thereby providing a small and compact termination for the cable.



3,731,255

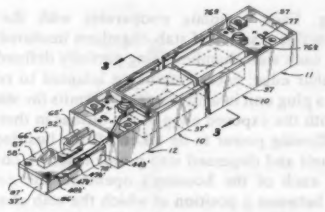
AUTOMATICALLY OPERABLE END CONNECTOR FOR A POWER DISTRIBUTION SYSTEM

James Contratto, Livermore, Calif., assignor to U.S. Industries, Inc., New York, N.Y.

Filed June 21, 1971, Ser. No. 154,782

Int. Cl. H01r *9/00*

U.S. Cl. 339—21 R **11 Claims**



An end connector for a power distribution system of the type providing an essentially continuous convenience outlet enabling electric plugs to be connected thereto at substantially any selected location therealong. The system includes one or more elongated track components that provide such convenience outlet, and each such track component is equipped along its length with a conductor assembly comprising a plurality of spaced apart electric conductors insulated one from another. The end connector is connectable with such track component at an end thereof, and may take the form either of a splice box used to join successive track components or of an end closure used to attach an end block or junction box thereto and within which the conductors of the distribution system are connected with power supply lines. The end connector, for the purpose of establishing connection thereof with a track component, has a housing portion insertable into the end of a track component, and the connector is equipped with a plurality of contacts that automatically engage and establish an electric connection with the respective conductors of the track component upon insertion of the housing portion of the end connector thereinto.

3,731,256

PLUG-IN BUS DUCT

Paul M. Hafer, Florence, Ky., assignor to Arrow-Hart, Inc., Hartford, Conn.

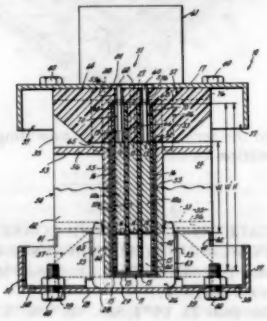
Filed Aug. 30, 1971, Ser. No. 176,001

Int. Cl. H01r *13/60*

U.S. Cl. 339—22 B **15 Claims**

A plug-in bus duct comprised of a group of elongated, flat busbars positioned in side-by-side relation within an elongated

housing, the housing having the side walls of a height substantially greater than the width of the busbars. Insulator sheets separate the busbars one from the other, and from the sides of the housing, to form a side wall-insulator sheet-busbar 'sandwich.' In preferred form, the busbars are all of the same cross-sectional configuration and dimensions, and each retains a planar configuration along its entire length from one end of the duct to the other. This construction leaves the top and bottom edges of the busbars exposed within the housing. An insulator template is installed in each of a plurality of openings cut in the top and bottom of the housing at spaced intervals

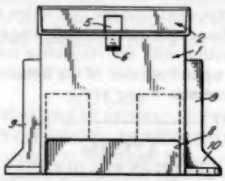


therealong. Each template cooperates with the insulator sheets to define a series of stab chambers insulated one from the other, each stab chamber being partially defined by an exposed busbar edge; each chamber is adapted to receive one stab from a plug unit in a manner that permits the stab to make contact with the exposed edge of the busbar in that chamber, thereby allowing power to be taken off the bus duct through the plug unit and dispersed into power leads. A cover is provided for each of the housing's openings, the cover being pivotable between a position at which the stab chambers are opened to receive the plug unit's stabs and a position at which the stab chambers are closed.

3,731,257
DIAGNOSTIC CONNECTOR

Roelof Johan Bakker, Langen, Hessen, Germany, assignor to AMP Incorporated, Harrisburg, Pa.

Filed Feb. 24, 1971, Ser. No. 118,267
Claims priority, application Germany, March 11, 1970, P 20 11 622.7
Int. Cl. H01r *9/08, 13/44, 13/54*
U.S. Cl. 339—44 M **2 Claims**

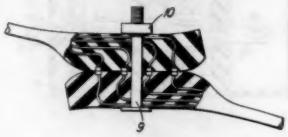


An electrical socket housing for a vehicle, comprising a one-piece body moulded of insulating material having contact receiving through-passageways. The socket body has a mounting means for mounting the housing on a panel support of a vehicle.

3,731,258
UNDERWATER CONNECTION

Lyndon Reginald Spicer, Cascades, Llandevand, Monmouthshire, Wales, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Sept. 22, 1971, Ser. No. 182,699
Int. Cl. H01r *31/00, 13/24*
U.S. Cl. 339—48 **1 Claim**

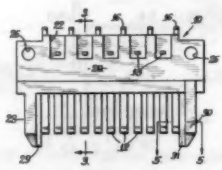


An electrical connector for use underwater or the like including two convex rubber bodies having one or more contacts embedded therein flush with the convex surfaces thereof. A bolt projects through aligned holes in the bodies. When the bolt is tightened with the convex surfaces in contact with one another, fluid between the bodies is squeezed out and a fluid tight seal is provided around each pair of mutually engaging contacts.

3,731,259
ELECTRICAL CONNECTOR

Carl Occhipinti, Melrose Park, Ill., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Filed July 2, 1971, Ser. No. 144,552
Int. Cl. H01r *13/62*
U.S. Cl. 339—66 M **3 Claims**



A multiple-contact electrical plug and mating receptacle having coacting contacts and contact pins with mating polarizing guide posts and slide sockets to facilitate easy mating of the plug and receptacle, with minimum tendency toward canting or binding of the parts; the assembly being designed to facilitate manufacture by molding the individual contacts in place in the dielectric plug while the leading ends of such contacts are still jointed and then shearing the ends of the contact pins.

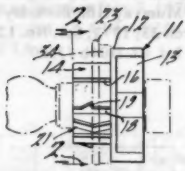
3,731,260
SOCKET HOUSING

Prisco D. Nardone, Rochester; Ronald G. Hollett, Roseville, and James E. Warrick, Birmingham, all of Mich., assignors to Microdot Inc., Greenwich, Conn.

Filed May 6, 1971, Ser. No. 140,674
Int. Cl. H01r *13/60*
U.S. Cl. 339—127 R **5 Claims**

The invention relates to a novel configuration for the housing portion of a lamp socket which is insertable through a notched aperture in a panel or the like. The housing has at least one finger which flexes circumferentially thereof when passing through a notch in the wall of the panel aperture. A rigid detent is circumferentially spaced from the flexible finger. After the detent passes beyond the edge of the aperture it is advanced thereover by rotation of the housing in a locking direction produced by the bias of the flexible finger on an edge portion of the aperture to lock the housing within the aperture. Additional notches may be provided for other fingers

and detents if a greater bias or locking overlap is necessary. To remove the housing from the panel the housing is rotated in



the opposite direction to the locking direction to flex the finger until the detent clears the edge of the notch so that the housing can be pulled outwardly thereof.

3,731,261

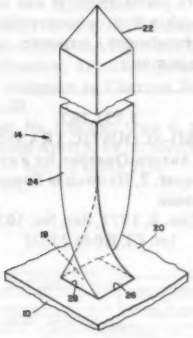
ELECTRICAL CONNECTOR WITH TWISTED POSTS

Frank G. Spadoni, Jr., Orange, Conn., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Continuation of Ser. No. 760,561, Sept. 18, 1968, abandoned. This application March 24, 1972, Ser. No. 237,942

Int. Cl. H01r 9/16

U.S. Cl. 339—220 R **6 Claims**



An improved electrical connector is disclosed which may be used to connect to a printed circuit board and is adaptable for use with automatic wire-wrapping machines. The terminal posts of the connector have a square cross section as do the holes in the base into which the posts are located. The posts are twisted about 90° to strengthen, straighten and insure a secure lock of the posts in the base.

3,731,262

TIME MARK-NUMERAL GENERATOR SYSTEM

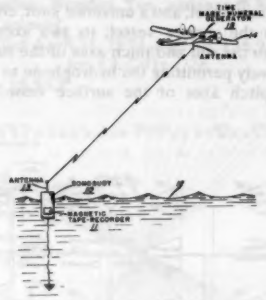
Roy B. Blake, Jr., Kernersville, N.C., assignor to The United States of America as represented by the Secretary of the Navy

Filed Sept. 28, 1967, Ser. No. 672,679

Int. Cl. G01s 1/72

U.S. Cl. 340—2 **6 Claims**

A system for recording at some remote point data which has been previously recorded by equipment located in a sonobuoy. Upon receipt of an interrogation signal the sonobuoy stops recording and starts to play back in the reverse direction. The recording time of the tape at the remote point is determined by using the time the playback is started



and by using a digital clock circuitry to duplicate in time the sequence and rate of operation of the tape in the sonobuoy.

3,731,263

UNDERWATER GUIDANCE METHOD AND APPARATUS

Charles K. Daniels, Weston, and John P. McCarthy, Cohasset, both of Mass., assignors to EG & G, Inc., Bedford, Mass.

Filed April 28, 1971, Ser. No. 138,037

Int. Cl. G01s 9/66

U.S. Cl. 340—3 R **15 Claims**

Equipment, such as a drill string, is guided from an ocean platform to a submarine wellhead by an acoustical energy system including a corner reflector at the wellhead, a pulse transmitter and associated transponder near the lower end of the drill string, and a receiver at the platform. The transmitter, operating at a first frequency, transmits pulses to the reflector, which reflects the pulses to the transponder. Energy is sent by the transponder to the platform receiver at a second frequency. When the transmitter and the receiver are in line with the wellhead reflector, energy at the first frequency is reflected directly to the receiver to produce a "go" signal.

3,731,264

APPARATUS FOR DETERMINING THE POSITION OF A SURFACE VESSEL WITH RESPECT TO A SIGNAL SOURCE

Leslie T. Campbell, Lakewood, and Joseph J. Vetter, Monrovia, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy

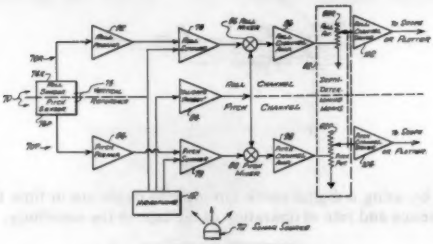
Filed Jan. 24, 1972, Ser. No. 219,964

Int. Cl. G01s 3/80

U.S. Cl. 340—3 PS **7 Claims**

Apparatus for determining the position in azimuth of a surface vessel, with respect to an underwater sonar signal source,

irrespective of the motion of the surface vessel, comprising a hydrophone, capable of determining the azimuth of an underwater sonar signal source with respect to the roll and pitch axes of the surface vessel, and a universal joint, connecting the hydrophone to the surface vessel, its two axes of rotation being parallel to the roll and pitch axes of the surface vessel, thereby effectively permitting the hydrophone to rotate about the roll and pitch axes of the surface vessel. A vertical



Schematic Diagram of Position-Determining System

reference, attached to the hydrophone so as to pitch and roll with it, comprises a roll sensor and a pitch sensor for determining the roll and pitch, respectively, of the hydrophone. A roll summer and a pitch summer, whose two inputs are the outputs from the hydrophone and the roll sensor and pitch sensor, respectively, serve to determine the true azimuth of the sonar signal source, with respect to the roll and pitch axes of the surface ship, in spite of any roll or pitch of the hydrophone, or of the surface vessel.

3,731,265

HOLOGRAPHIC IMAGING SYSTEM BY ULTRA-SOUND

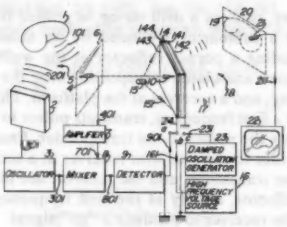
Soji Sasaki, Hitachi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 1, 1971, Ser. No. 203,725

Claims priority, application Japan, Dec. 16, 1970, 45/111797

Int. Cl. H04b *11/00*

U.S. Cl. 340—5 H **9 Claims**



In ultrasonic holography in which a hologram is obtained by a process including the steps of projecting an ultrasonic beam on to an object to be analyzed, mixing the beam transmitted through or reflected from the object with a reference ultrasonic wave to produce an interference pattern or a hologram on a plane, and recording the interference pattern by a photographic or other recording means; a system for reproducing a holographic image from the thus obtained hologram using an ultrasonic wave instead of a coherent light, use of the latter on a miniaturized hologram having been common in the conventional system; and modified systems of the same.

3,731,266

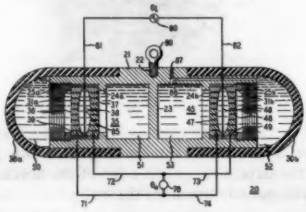
INERTIA-COMPENSATED A.C. BIASED HYDROPHONE INCORPORATING A POROUS CAPACITANCE TRANSDUCER

Hans Hugo Ammann, Chester, N.J., assignor to Bell Laboratories, Incorporated, Murrray Hill, Berkeley Heights, N.J.

Filed March 25, 1971, Ser. No. 128,011

Int. Cl. H04b *13/00*

U.S. Cl. 340—8 LF **13 Claims**



A porous capacitance transducer for producing electrical output signals in response to dynamic pressure fluctuations in a surrounding liquid medium substantially comprises an electrically conductive membrane in parallel spaced relation with a collimated hole structure (CHS) plate, which is a porous metal structure containing a controlled number and distribution of discrete parallel capillaries. An inertia and depth-compensated a.c. biased hydrophone incorporating the basic porous capacitance transducer substantially comprises first and second membranes respectively associated with first and second pairs of CHS plates and first and second pairs of oil-filled reservoirs. Such a hydrophone exhibits improved sensitivity, acoustic bandwidth response, dynamic pressure response, and noise immunity.

3,731,267

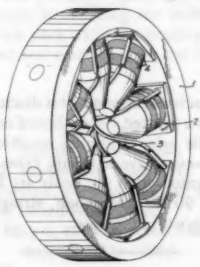
ELECTRO-ACOUSTIC TRANSDUCER

Otto Brandt, Villa Aurora-Quartier les Faysses, 83 Le Brusc, and Bernard Tocquet, 2, Hameau la Poussaraque, 83 Sanary s/Mer, both of France

Filed Jan. 4, 1971, Ser. No. 103,666

Int. Cl. H04b *13/02*

U.S. Cl. 340—9 **3 Claims**

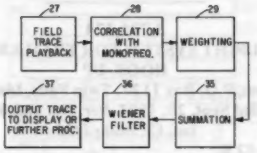


An electro-acoustic transducer comprises an enclosure of closed form containing a plurality of piezo-electric motors, each connected to the enclosure to excite the same, the motors having no mechanical connection between one another capable of transmitting static or dynamic forces. The transducer has two acoustic frequency ranges which are independent of the value of the static pressure prevailing on the outside of the transducer, one frequency range being due to the resonance of the envelope, and the other to the resonance of the motors.

3,731,268
TIME-COMPRESSING MULTI-TRANSMISSION SIGNALS

Ralph A. Landrum, Jr., Tulsa, Okla., assignor to Amoco Production Company, Tulsa, Okla.

Continuation-in-part of Ser. No. 796,348, Feb. 4, 1969, abandoned. This application Dec. 7, 1970, Ser. No. 95,964
Int. Cl. G01v *1/28*
U.S. Cl. 340—15.5 TA 8 Claims

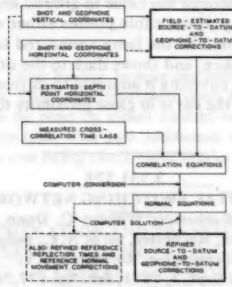


For each seismic receiver location *n* multi-transmission signals, which are similar in form but differ in peak frequency within a frequency range of interest, are time-compressed by cross-correlating the received signals containing it with each transmitted signal alone, weighting the resulting *n* correlation functions to produce for each event arrival the simplest compressed central wavelet when said *n* correlation functions are added with zero-lag times in coincidence, summing the weighted correlogram traces, and Wiener filtering the summation trace to reduce its amplitudes substantially to zero outside of said central wavelets.

3,731,269
STATIC CORRECTIONS FOR SEISMIC TRACES BY CROSS-CORRELATION METHOD

Roger D. Judson, Houston, Tex., and John W. C. Sherwood, Whittier, Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 848,061, Aug. 6, 1969, abandoned. This application April 5, 1971, Ser. No. 134,099
Int. Cl. G01v *1/36*
U.S. Cl. 340—15.5 CC 7 Claims

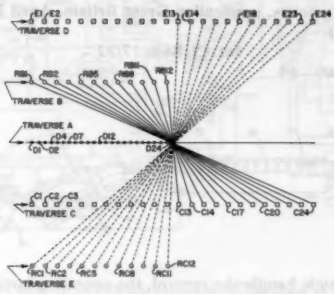

SHOT AND GEOPHONE VERTICAL COORDINATES
SHOT AND GEOPHONE HORIZONTAL COORDINATES
FIELD - ESTIMATED SOURCE - TO - DATUM AND GEOPHONE - TO - DATUM CORRECTIONS
ESTIMATED DEPTH POINT HORIZONTAL COORDINATES
MEASURED CROSS - CORRELATION TIME LAGS
CORRELATION EQUATIONS
COMPUTER CONVERSION
NORMAL EQUATIONS
COMPUTER SOLUTION
ALSO: REFINED REFLECTION TIMES AND REFERENCE NORMAL MOVEMENT CORRECTIONS
REFINED SOURCE - TO - DATUM AND GEOPHONE - TO - DATUM CORRECTIONS

A method is disclosed for determining source-to-datum corrections for a multitrace seismic cross-section. The method comprises the measurement of a multiplicity of cross-correlation functions between selected traces of the seismic section to establish a redundant set of simultaneous equations including the desired source-to-datum and geophone-to-datum quantities. The simultaneous equations are then solved for the desired corrections by the least squares error method. The method of the invention also provides for the determination of residual normal moveout corrections.

3,731,270
SEISMIC EXPLORATION USING THE COMMON REFLECTION POINT TECHNIQUE

John O. Penhollow, Houston, Tex., assignor to Esso Production Research Company

Filed April 21, 1971, Ser. No. 135,957
Int. Cl. G01v *1/28*
U.S. Cl. 340—15.5 CP 6 Claims

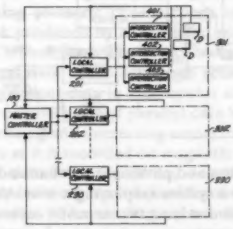


The common reflection point seismic technique wherein the locations of seismic disturbances and the locations of seismic wave detection stations are positioned on the same traverse, is utilized to produce a plurality of seismic records having events produced by reflections from common reflection points. A plurality of detection locations are located on one side of the first traverse and a plurality of transmitting locations are located on the other side of the traverse such that ray paths from a given disturbance location to a given detecting location will include a common reflection point. Seismic disturbances are initiated in sequence at the transmitting locations and detected at the detection locations. Seismic records thus produced are combined such that event records from common reflection points reinforce each other.

3,731,271
TRAFFIC SIGNAL CONTROL SYSTEM

Akira Muramatu, Osaka, and Tadao Endo, Kyoto, both of Japan, assignors to Omron Tateisi, Kyoto, Japan

Continuation-in-part of Ser. No. 828,645, May 28, 1969, abandoned. This application Nov. 26, 1971, Ser. No. 202,536
Int. Cl. G08g *1/07*
U.S. Cl. 340—41 2 Claims



A relatively wide area in which the traffic signals are to be controlled is divided into a plurality of local areas each having a local signal controller. There are provided a plurality of different cycle signals and a plurality of different synchronizing signals paired with the cycle signals. A master controller always watches the traffic condition in each of the local areas and causes each local controller to select that one of the pairs of cycle signals and synchronizing signals which is most suitable for control of the traffic signals in each local area under the present traffic conditions. In turn, each local controller uses the selected cycle and synchronizing signal to control a plurality of intersection controllers in the local area, each in-

tersection controller being associated with an intersection traffic signal.

3,731,272

HANDBRAKE CONTROLS FOR ROAD VEHICLES

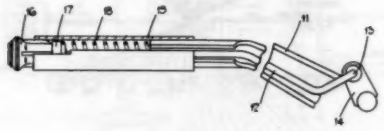
Edward Cryer, Higham, near Burnley, England, assignor to Joseph Lucas (Industries) Limited, Birmingham, England

Filed March 29, 1971, Ser. No. 128,864

Claims priority, application Great Britain, April 24, 1970, 19,699/70

Int. Cl. B60t *17/22*

U.S. Cl. 340—69 **4 Claims**



In a vehicle handbrake control, the operating button of the handbrake carries a bulb which is exposed through a lens positioned in the button. One electrical connection to the bulb is made by a conductive rod which is connected to the handbrake release mechanism and is movable by the button to operate the handbrake release mechanism. Another electrical connection to the bulb is made by way of a hollow conductive member within which the conductive rod is mounted so that an electrical circuit through the bulb can be made to energize the bulb. The circuit also includes a switch so that the circuit can only be completed when the handbrake is operative.

3,731,273

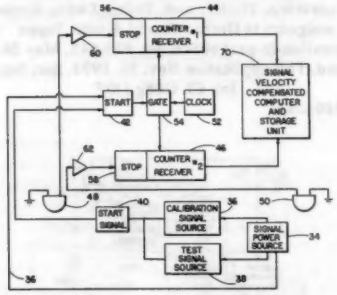
POSITION LOCATING SYSTEMS

William E. Hunt, 2221 South Anchor, Anaheim, Calif.

Filed Nov. 26, 1971, Ser. No. 202,361

Int. Cl. G01s *3/80*

U.S. Cl. 340—16 **8 Claims**



Position location and plotting is mechanized and accurately accomplished in a system employing a movable transmitter of acoustic signals and at least two acoustic receivers whose position is fixed. The system measures transit time from the transmitter to the receivers. It measures propagation velocity of the acoustic signal to determine distance from the transmitter to the two receivers and ultimately locates the transmitter's position relative to the two receivers. A signal of a kind that is more rapidly propagated than acoustic signals is generated simultaneously with initiation of the acoustic signal to form a start signal. Receipt of the acoustic signal at the receivers is made the occasion for generating a stop signal and the distance computation is made on the basis of the time interval elapsing between the start and stop signals. In the preferred embodiment the transmitter comprises a spark gap and the start signal is an electrical signal which is provided as an incident to current flow through the gap. A second spark gap, and means for developing a second start signal, has a fixed position relative to the two receivers. That arrangement is utilized to provide a high order of accuracy. To enhance accuracy even more, the two spark gaps are miniaturized and the structure for supplying energy currents to them and for developing start signals are made similar and the two systems are energized alternately from a common source. Special microphones receive acoustic signals at a known distance from a reference position whereby point-to-point distance and direction is accurately measured.

3,731,274

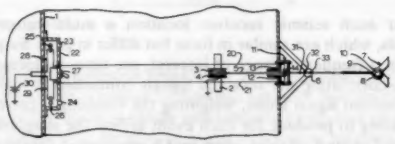
GUIDING LIGHT SYSTEM FOR TRAILER TOW CAR HOOK-UP

Laurence Green, P.O. Box 1127, Twin Falls, Idaho

Filed Sept. 20, 1971, Ser. No. 182,017

Int. Cl. B60q *1/00*

U.S. Cl. 340—52 R **4 Claims**



This apparatus embodies equipment to produce in front of the driver of a tow car two signal devices in the form of lamps which show the driver of the car whether or not it is backing directly toward the hook-up position to attach a trailer coupling when it is close to this position and when it reaches hook-up position. The signal devices are right-hand and left-hand lamps, mounted on the dash or the instrument panel of the car. At the rear end of the car two spring contactors are mounted on the car side by side. A cable passes between the contactors and is wound on a spring take-up reel that is spaced in front of the spring contactors on the car. The cable is an electricity conductor and has means, insulated from the cable at its free end to attach it to the trailer coupling. The lamps each have one terminal connected to the ungrounded side of the car battery and the other terminal connected to one of the spring contactors so that so long as the cable engages both contactors there is a circuit completed from the battery through each lamp then through its conductor to the spring contactor, then through the cable to ground and the grounded side of the battery. If the cable pushes either contactor away from the other one then the lamp connected to the other one has its circuit broken, and shows dark to the driver. The cable has an insulation, covering it adjacent to its free end to darken both lamps when the car is in close proximity to hook-up position.

3,731,275

DIGITAL SWITCHING NETWORK

Pedro A. Lenk, Rochester; William C. Dunn, Pittsford, and Ramses R. Mina, Rochester, all of N.Y., assignors to Stromberg-Carlson Corporation, Rochester, N.Y.

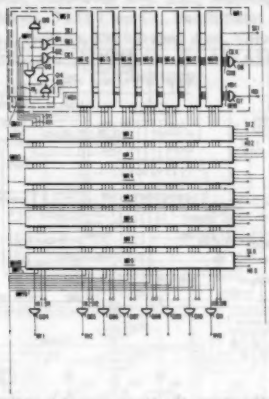
Filed Sept. 3, 1971, Ser. No. 177,743

Int. Cl. G11c *29/00*

U.S. Cl. 340—146.1 AB **24 Claims**

A solid state semiconductor matrix switch for transmitting digital data from a set of input-output leads to any one of a number of output-input leads includes circuitry for marking and selecting cross point circuits through the network of the switch. In addition, circuitry for holding selected crosspoints after mark signals have been removed is employed. Typically, the switch includes an 8 X 8 matrix array of cross point circuits which are capable of providing eight individual paths through the matrix, no two operated crosspoints being located in any vertical or horizontal matrix strip. In addition, a circuit for checking the vertical matrix strips to determine which of

the crosspoint circuits are completed is included. Also, an error checking system is employed to determine if more than a

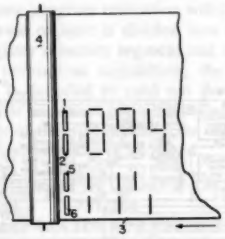


single crosspoint circuit in any one of the vertical matrix strips is operates.

3,731,276
RETRIEVAL CODE

Harry F. Rayfield, Bradbury, Calif., assignor to Terminal Data Corporations, Van Nuys, Calif.

Filed May 19, 1971, Ser. No. 144,960
Int. Cl. G06k *9/18*
U.S. Cl. 340—146.3 Z **2 Claims**



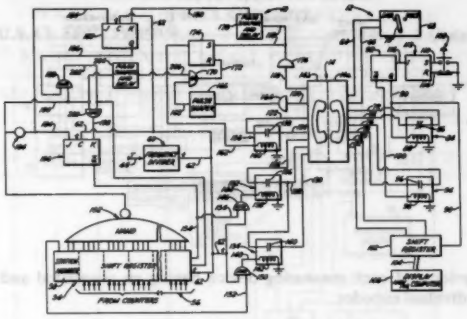
A numeric code having human-readable and correlative mark elements. These are impressed upon a medium carrying information to be read by either human or machine inspection. Block numerals with two additional rows of marks are employed, one row being clock pulse marks.

3,731,277
DATA ACCUMULATION AND TRANSMISSION SYSTEM FOR USE BETWEEN REMOTE LOCATIONS AND A CENTRAL LOCATION

Ronald L. Krutz, and Thomas J. Villella, both of New Kensington, Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed June 24, 1970, Ser. No. 49,235
Int. Cl. H04q *3/00*
U.S. Cl. 340—163 R **41 Claims**

A data accumulation and transmission system wherein a plurality of independent data generators are sequentially triggered in such a manner that the rate of speed of the triggering pulse is much greater than the rate of speed of data production. Double counting is prevented by utilizing the trailing edge of each data pulse to reset the device which the triggering pulse sets. The data is communicated, for example, across a telephonic connection in a highly reliable manner by utilizing a clock to drive the data out of a shift register and to simul-

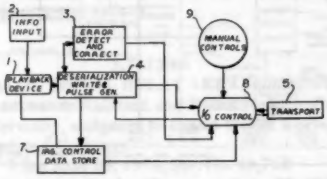


taneously gate-in the clock pulses with the data at the sending telephone.

3,731,278
FORMAT CONVERSION SYSTEM

Brice Eldridge, Ramsey, N.J.; Christopher G. Davy, Vienna, Va., and Richard A. Michals, Skokie, Ill., assignors to Stenographic Machies, Inc., Skokie, Ill.

Filed Feb. 9, 1970, Ser. No. 9,516
Int. Cl. G06f *3/02*; B41j *3/26*
U.S. Cl. 340—172.5 **9 Claims**



A computer interfacing device for converting serial input data representing phonetic constructions of words or word parts of the link produced by a shorthand machine into parallel output data is described. The device includes means for accumulating input data which arrives in serial bit by bit form and generating output data in a computer compatible format comprising successive bytes of parallel data bits. Means are included for detecting and correcting errors in the alignment of the output data as it is recorded on magnetic tape, for separating the output data into records and recording a prescribed inter-record gap between records, and for detecting the end of recorded input data and recording a prescribed file gap at the end of the last record.

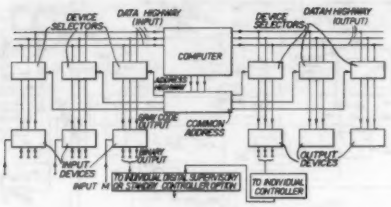
3,731,279
CONTROL SYSTEMS

James Richard Halsall, 17, Whiteknights Road, Reading, and Alan Percy Cooper Murrell, Old River Cottage, Guildford, both of England

Continuation-in-part of Ser. No. 787,737, Dec. 30, 1968, abandoned. This application July 29, 1971, Ser. No. 167,413
Int. Cl. G06f *3/00*
U.S. Cl. 340—172.5 **9 Claims**

A control system in accordance with this invention provides a Digital computer supervised electric control system for

monitoring and controlling a plurality of separate variables each variable having an associated and individual measuring device and each measuring device having an associated and individual encoder.

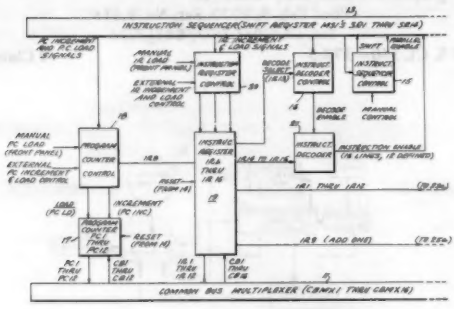


3,731,280

PROGRAMMABLE CONTROLLER

Robert Shevlin, Manhasset, N.Y., assignor to Varisystems Corporations, Plainview, N.Y.

Filed March 16, 1972, Ser. No. 235,202
Int. Cl. G06f 9/06
U.S. Cl. 340—172.5 **7 Claims**


INSTRUCTION SEQUENCER (SHIFT REGISTER MSI'S 301 THRU 384)
PC INCREMENT AND PC LOAD SIGNALS
MANUAL PC LOAD (FRONT PANEL)
EXTERNAL PC INCREMENT & LOAD CONTROL
INSTRUCTION REGISTER CONTROL
INSTRUCT DECODER CONTROL
INSTRUCTION SEQUENCER CONTROL
PROGRAM COUNTER CONTROL
INSTRUCTION REGISTER
INSTRUCT DECODER
INSTRUCTION ENABLE (176 LINES, 12 DEFINED)
LOAD (PC LD)
INCREMENT (PC INC)
RESET (FROM I/O)
COMMON BUS MULTIPLEXER (COMMX) THRU COMMX(N)

A programmable controller for use in controlling a wide variety of external data and production devices and having an extremely flexible stored program capability enabling the device to function as a small-scale computer adapted for use as either a systems controller or as a "stand alone" mini-computer.

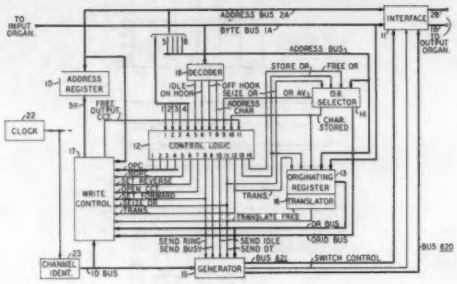
3,731,281

RECIRCULATING STORE CIRCUIT FOR TIME-DIVISION SWITCH PROCESSOR

Travis Hill Gordon, Eatontown; Patrick John Marino, Middletown, and Randolph John Pilc, Holmdel, all of , N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed June 28, 1971, Ser. No. 157,155
Int. Cl. H04j 3/00; G11c 21/00
U.S. Cl. 340—172.5 **12 Claims**

In a time-division switch, a recirculating store alternatively stores address words and channel status words. When two subscribers are interconnected, the store applies address words to an address bus to enable the switch to steer data from one subscriber to the other. When a channel is idle or a call is being set up, the store passes status words to a processor to define the state of the channel. The processor, in turn, and under control of the store output words together with data from the channel, alternatively provides new address words and new status words to the store. If the processor does not provide a new word to the store, the store output is recirculated back to the input.

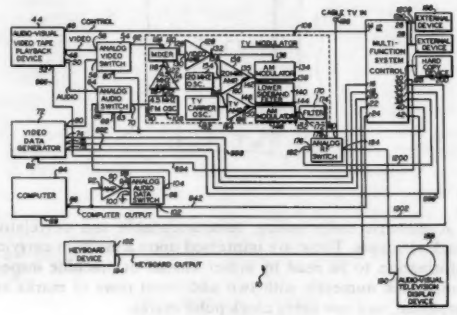


3,731,282

MULTIFUNCTION ROUTING NETWORK

Douglas E. Dancis, Putnam Valley; Gerald E. Dorfuss, White Plains, and Benjamin C. Zitron, New York, all of N.Y., assignors to Allied Management & Systems Corporation, New York, N.Y.

Continuation of Ser. No. 41,795, June 1, 1970. This application Aug. 27, 1971, Ser. No. 175,557
Int. Cl. G06f 9/19, 3/00, 15/56
U.S. Cl. 340—172.5 **19 Claims**



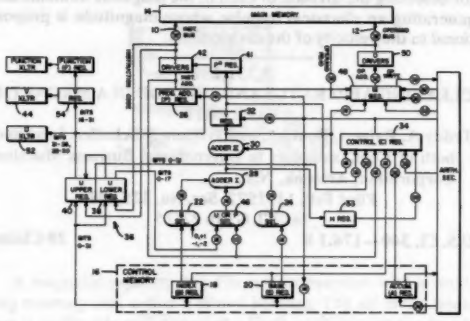
A multifunction routing network. The routing network is provided with a function control means including a condition responsive logic network having an iterative multifunction control loop. Register and memory means are also provided in the routing network which are operatively associated with the control means for providing input conditions thereto and for receiving output conditions therefrom. The logic network is provided with a multistable means having a plurality of states and is responsive to the states thereof and the input conditions thereto to provide a plurality of control functions of both a data control and an execute non-data control nature for the routing network. A computer, an input keyboard, an audio-visual playback device, and a television are also provided which are operatively associated with the register and memory means for providing input conditions thereto and for responding to output conditions therefrom.

3,731,283

DIGITAL COMPUTER INCORPORATING BASE RELATIVE ADDRESSING OF INSTRUCTIONS

Lewis R. Carlson, 1055-24th Ave. S.E., Minneapolis, Minn.; Eugene E. Hervig, 7131 Clay Ct., South Saint Paul, Minn., and Kenneth J. Oehlers, 5950 Donna Ave., Tarzana, Calif.

Filed April 13, 1971, Ser. No. 133,654
Int. Cl. G06f *9/10*
U.S. Cl. 340—172.5 4 Claims



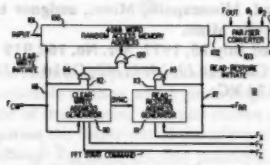
A relative addressing scheme for a digital computer which allows programs of instructions to be stored in the computer memory at locations which may be addressed relative to predetermined base values rather than at absolute assigned addresses to facilitate program relocation within the memory. The program address register is divided into two segments, namely, a base register selection segment and a displacement segment. During instruction acquisition, the base register selection segment is decoded to read out the contents of a selected base register and these contents are added to the displacement segment of the program address register to define the address of the instruction to be acquired.

3,731,284

METHOD AND APPARATUS FOR REORDERING DATA

Fred Walter Thies, Greensboro, N.C., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Dec. 27, 1971, Ser. No. 211,882
Int. Cl. G06f *9/20, 7/00*
U.S. Cl. 340—172.5 13 Claims



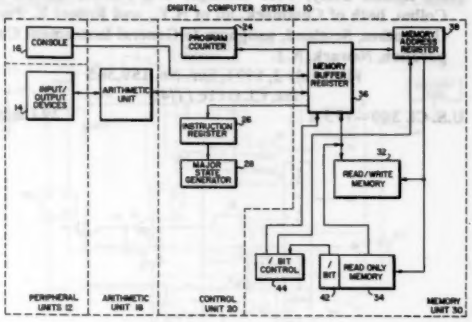
A reordering method and associated apparatus for storing and accessing samples of a physical process to facilitate the generation of Fourier series coefficients is disclosed. In particular, methods and apparatus for generating storage and retrieval patterns for a sequence of sampled data for facilitating the computation of fast Fourier transformation (FFT) of a plurality of overlapped records is disclosed.

3,731,285

HOMOGENEOUS MEMORY FOR DIGITAL COMPUTER SYSTEMS

C. Gordon Bell, 553 Briarcliff, Pittsburgh, Pa.

Filed Oct. 12, 1971, Ser. No. 188,084
Int. Cl. G11c *7/00*
U.S. Cl. 340—172.5 7 Claims



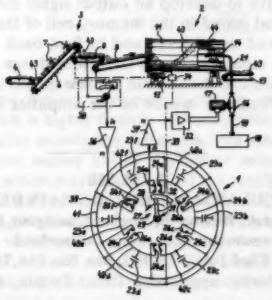
A digital computer system with a memory unit comprising both "read-only" locations from which information can only be read and "read-write" locations from which information can be read and into which information can be written. Both read-only and read-write memory locations store information in the same format, but each read-only location contains an extra bit position for a "state" bit. The digital computer system normally addresses the read-only locations in sequence. If a state bit in any read-only location is set, a control in the memory interprets the information in that location as an address, normally for a read-write memory location for storage or retrieval of information. When the state bit is not set, the read-only location contains information for direct use by the digital computer system.

3,731,286

ANALOG SIGNAL DELAY ARRANGEMENT

Gerhard Graalmann, Wohltorf, and Dieter Wellach, Hamburg, both of Germany, assignors to Hauni-Werke Korber & Co. K.G., Hamburg, Germany

Filed June 25, 1970, Ser. No. 49,718
Claims priority, application Germany, June 28, 1969, P 19 32 906.7
Int. Cl. G11c *11/24, 27/00*
U.S. Cl. 340—173 RC 10 Claims



An analog signal representing a continuously measured value is distributed to a plurality of capacitors, by a cyclic closing of a first set of contacts. The signal stored on the capacitors are read out by cyclic closing of another set of contacts which connect the capacitors to a receiver station. Each value of analog signal is delayed by the time interval between

the storing in the capacitor and the read out from the same capacitor which occurs during the same cycle.

3,731,287

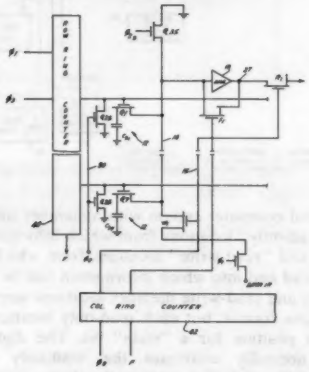
SINGLE DEVICE MEMORY SYSTEM HAVING SHIFT REGISTER OUTPUT CHARACTERISTICS

John Leland Seely, Fort Salonga; Leo Cohen; Ronald P. Colino, both of Commack, all of N.Y., and Robert E. Pace, Glenrothes, Scotland, assignors to General Instrument Corporation, Newark, N.J.

Filed July 2, 1971, Ser. No. 159,365

Int. Cl. G11c *11/40*

U.S. Cl. 340—173 R **29 Claims**



A memory or delay system having a fixed address layout provides an output of the shift register type with a significant decrease in the number of transistors per bit required resulting in a greatly increased storage capacity. A plurality of memory cells are arranged in a fixed address array and means are provided for addressing all memory cells in timed sequence. THe addressing means comprises a row ring counter and a column ring counter responsive to the row ring counter and effective to sequentially address each column of memory cells after a complete row address cycle. A plurality of column conductors operatively connect the memory cells in each column to a common output circuit and are adapted to transfer the data signal stored in the selected address to said output circuit.

Means are provided to clear all column conductors to a given reference voltage prior to each addressing operation, all memory cells being isolated from their respective column conductors during this clearing operation.

A refresh amplifier is provided for each column conductor and is effective to develop an output signal corresponding to the data signal stored in the memory cell of the selected row, at an enhanced signal level, and to feed back that enhanced signal to the memory cells in the selected row. Means operatively connected to the column address means are provided to disable the feedback means of the amplifier in the selected row.

3,731,288

CIRCULAR MAGNETIC DOMAIN DEVICES

Anthony Marsh, Blisworth, England, assignor to Plessey Handel Und Investments A.G., Zug, Switzerland

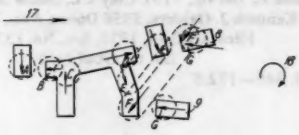
Filed July 28, 1971, Ser. No. 166,751

Claims priority, application Great Britain, Aug. 19, 1970, 39,838/70

Int. Cl. G11c *11/14, 19/00*

U.S. Cl. 340—174 TF **6 Claims**

A circular magnetic domain device wherein binary information in the form of propagating circular magnetic domains is converted into information in the form of electrical impulses by causing each of the propagating magnetic domains to be expanded in a direction transverse to its direction of propagation in order to effect an abrupt division of the domain into at least two separate parts which collapse very rapidly after division into two circular magnetic domains. Means are provided



for detecting the division of each of the magnetic domains and generating an electrical impulse whose magnitude is proportional to the velocity of the division.

3,731,289

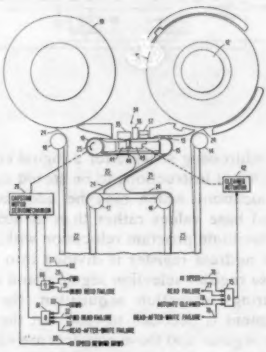
CLEANING APPARATUS AND METHOD IN A MAGNETIC TAPE UNIT

Teddy A. Bajgert, Boulder, and William J. Schaffer, Loveland, both of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 11, 1972, Ser. No. 225,441

Int. Cl. G11b *27/36*

U.S. Cl. 340—174.1 R **29 Claims**



Automatic head/tape cleaning apparatus wherein a cleaning member is selectively positioned in the head/tape transducing interface. The tape tension, normally effective to hold the tape to the head during read/write operation, is effective to hold the cleaning member against the head when it is in operative cleaning position. The movement of the cleaning member to its operative position at the transducing interface is automatically accomplished as part of read-after-write error detection, as part of read error detection, and as a result of high speed tape movement.

3,731,290

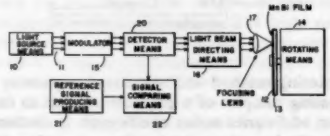
OPTICAL MASS MEMORY

Roger L. Aagard, Minneapolis, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed July 15, 1971, Ser. No. 162,919

Int. Cl. G11c *11/14, 11/42*; G01d *15/12*

U.S. Cl. 340—174 YC **6 Claims**



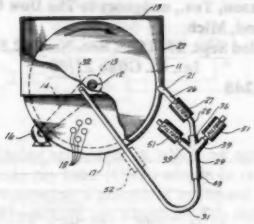
An optical mass memory of the Curie point writing type includes a system for instantaneously checking written bits to

ensure that the magnetization direction of the bit was properly stored.

3,731,291
INTEGRATED POSITIVE PRESSURE AND SELF-PURGE SYSTEM

Robert J. Walsh, Thousand Oaks, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed April 12, 1971, Ser. No. 133,213
Int. Cl. G11b *23/04*
U.S. Cl. 340—174.1 E **22 Claims**

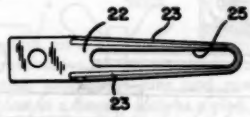


A magnetic memory disk file system operates with a rotating memory disk within a closed housing. The air in the housing is preferably maintained at a slight positive pressure by addition of filtered air. Generation or release of particles within the housing during rotation of the disk may interfere with the magnetic memory system and are, therefore, removed by a self-purging loop taking air from the housing through a filter and returning it to the housing. The pressurization and self-purging systems are combined by way of an ejector pump for vectorially adding gas streams, thereby in one embodiment providing a positive pressure throughout the interior of the housing due solely to the "pumping" action of the rotating disk without a requirement for auxiliary pressurization. In another embodiment, a source of pressurizing gas induces self-purging within the housing whether or not the disk is rotating.

3,731,292
FINGER BETWEEN FLEXIBLE DISC AND BACKING PLATE

Jerry O. Kelley, Grass Valley, Calif., assignor to Arvin Industries, Inc., Columbus, Ind.

Filed Sept. 27, 1971, Ser. No. 183,856
Int. Cl. G11b *5/58*
U.S. Cl. 340—174.1 E **11 Claims**

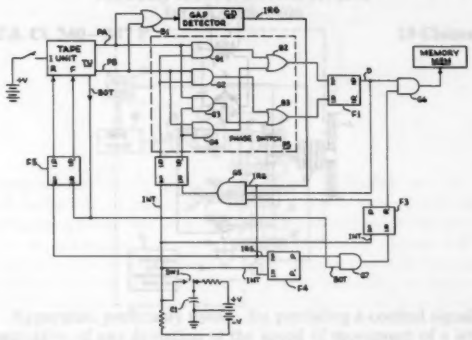


A magnetic recording system includes a flexible record disc with a magnetizable surface, and a guide finger which engages the underside of the rotating disc and moves a portion of the disc flowing over the finger out of the plane of rotation of the disc. A transducer has its active face mounted close to a channel formed in the guide finger, such that a part of the deflected portion of the flexible disc is captured between the guide finger and the transducer. The flexible disc is supported either upon the perforated turntable, or as part of a sandwich construction including a flexible self-sustaining base attached at its center to the record disc, and a cover extending over the magnetizable surface of the record disc. A hub structure is secured to the record disc and the supporting disc, with the cover having a rotatable connection to the hub structure.

3,731,293
AUTOMATIC PHASE SWITCHING OF PHASE-CODED RECORDINGS

Robert B. McFiggans, Stamford, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed April 5, 1972, Ser. No. 241,266
Int. Cl. G11b *5/02, 5/44*
U.S. Cl. 340—174.1 H **8 Claims**

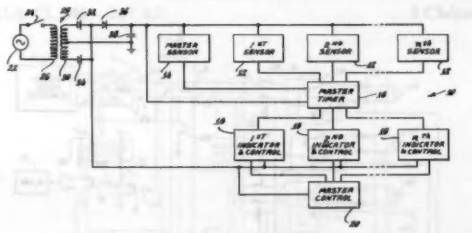


Apparatus reads phase-coded flux representing data from a magnetic tape and at the end of a block of data determines whether the representation of the magnetic flux transition at the end of the block is in a particular direction and if not the read out signals are inverted while the tape is reread.

3,731,294
MONITORING SYSTEM

Leslie Vass, Bridgeport, Conn., assignor to Harvey Hubbell, Incorporated, Bridgeport, Conn.

Filed Aug. 24, 1971, Ser. No. 174,422
Int. Cl. G08b *19/00*
U.S. Cl. 340—213 R **12 Claims**

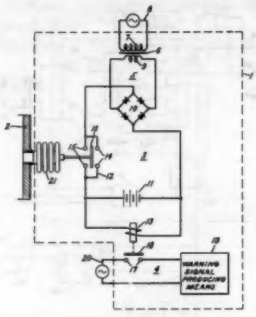


A monitoring system for manufacturing or processing operations which is highly flexible and adaptable to provide a number of diverse monitoring functions. The system includes a highly sensitive sensor having a pressure switch and a resistance probe which may be connected in a number of diverse ways to provide different combinations of sensing functions; a resistance bridge connected to the pressure switch and resistance probe which becomes unbalanced when the predetermined event is sensed; an amplifier for amplifying the unbalance of the bridge; and an electronic switch controlled by the resistance bridge to provide an output signal when the event is sensed. The output signal may be connected directly to an indicator and control section for indicating the sensed event or it may be coupled through a master timer under the control of a master sensor or clock. The indicator includes a latch and nonlatch mode and provides an output signal to a master control which, through appropriate contact logic, can initiate a variety of control functions as desired.

3,731,295
LEAK DETECTOR FOR ENCLOSED ELECTRICAL APPARATUS

Robert Van Luyn, Rome, Ga., assignor to General Electric Company

Filed March 17, 1971, Ser. No. 125,121
Int. Cl. G08b 21/00
U.S. Cl. 340—242 5 Claims

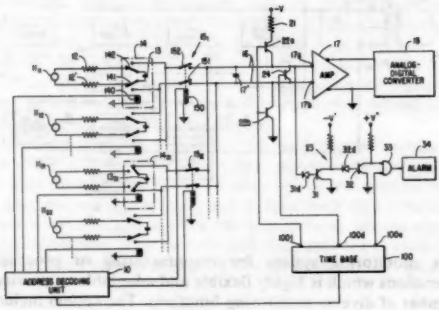


A detector for sensing the presence of a leak in a sealed, fluid-filled enclosure for electrical apparatus. The detector includes means for determining when the pressure within the enclosure is substantially equal to the pressure without the enclosure. When such a condition has existed for a preselected time period a warning device is actuated to indicate the existence of a leak in the enclosure.

3,731,296
TRANSFER CHECKING DEVICE FOR ANALOG DATA ACQUISITION SYSTEM

Nathan Spira, Clamart, France, assignor to Controle Bailey (Societe Anonyme), Clamart, France

Filed Jan. 28, 1972, Ser. No. 221,698
Claims priority, application France, Feb. 5, 1971, 7103870
Int. Cl. G08b 21/00
U.S. Cl. 340—248 A 3 Claims

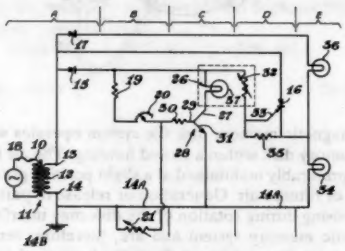


A data transfer checking device for an analog data acquisition system of the type in which each one of a plurality of data sources each delivering a data voltage are cyclically made to charge a capacitor, the charging voltage of which is subsequently transferred to the input terminals of an amplifier after the capacitor electrodes have been switched to said terminals. These terminals are respectively connected to the poles of a d.c. voltage source through the source-and-drain circuits of two field effect transistors, the gates of both of which receive test pulses from a time base. A difference voltage between the actual potential of one of said input terminals and a reference voltage is thus cyclically obtained, and this difference voltage is applied to one of the inputs of an AND gate, the other input of which cyclically receives sampling pulses from said time base. When the capacitor voltage has not been properly transferred, the difference voltage takes such a value that a signal appears at the output of the AND gate and actuates an alarm circuit. A third field effect transistor connected across the amplifier input and the gate of which cyclically receives discharge pulses eliminates any residual voltage existing at said amplifier input.

3,731,297
APPARATUS FOR DETECTING THE ACID FORMATION IN LIQUID SOLVENTS

James L. Dunn, Jr.; James C. Renfro, and John V. Goode, all of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sept. 25, 1968, Ser. No. 762,532
Int. Cl. G08b 21/00
U.S. Cl. 340—248 4 Claims

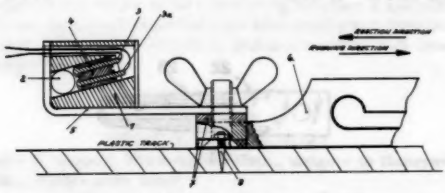


The present invention comprises a method and apparatus for detecting acid-formation in non-conductive liquids by monitoring the change in resistance brought about by the acid-corrosion of a metal immersed in said liquid.

3,731,298
ATHLETIC FALSE STARTS DETECTOR

Michael Weidacher, Spicherenstrasse 10, Munich, Germany

Filed April 8, 1971, Ser. No. 132,356
Claims priority, application Germany, April 10, 1970, P 20 17 288.7
Int. Cl. G08b 21/00
U.S. Cl. 340—262 11 Claims



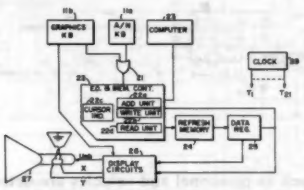
The present device is constructed for detecting false starts in athletic events. For this purpose inertia switching means are rigidly but nevertheless removably attachable to the starting plate so that any athlete may use his own individual starting plate. The inertia switching means comprise an insulating block and a conducting inertia body movably supported in said insulating block which also has supported therein two contact wires with exposed ends to be directly connected to each other when the entire insulating block moves in a given direction in response to a start while the electrically conducting inertia body remains briefly in position due to its inertia. A slope in the insulating block assures that the inertia body goes back to its non-contacting position.

3,731,299

GRAPHICAL KEYBOARD OPERATED DISPLAY DEVICE

Richard J. Bouchard, Amherst, N.H., and William R. Sanders, Palo Alto, Calif., assignors to Sanders Associates, Inc., South Washua, N.H.

Filed Oct. 2, 1970, Ser. No. 77,490
Int. Cl. G06f 3/14
U.S. Cl. 340—324 A 11 Claims



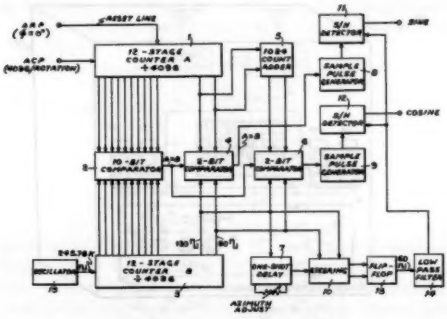
Graphical display apparatus in which an operator can display on a cathode ray tube (CRT) screen in real time graphical images by operating a graphical keyboard. The graphical keyboard has keys which are designated by differently sloped ones of a group of incremental line segments. The graphical keyboard can be employed in a display system which also includes an alphanumeric keyboard.

3,731,300

DIGITAL TO SIN/COS CONVERTER

Weldon Wayne Greutman, Hicksville, Ohio, and Isacc Roger Studebaker, Fort Wayne, Ind., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Aug. 13, 1971, Ser. No. 171,577
Int. Cl. H03k 13/02
U.S. Cl. 340—347 DA 7 Claims



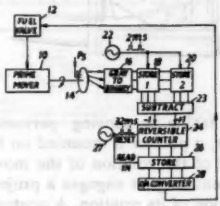
In a radar system, an arrangement for converting digital information representative of the rotational (azimuthal) position of the radar antenna to sine and cosine of azimuth waveforms for use in a display such as a plan position indicator. Azimuth change pulses indicative of the antenna's rotation and azimuth reference pulses indicating the 0° reference direction are applied to a first counter, the individual outputs of each stage of which are in turn coupled to a comparator arrangement. The state of the first counter is compared with that of a second counter which is fed by a pulse source standard. The output of the last stage of the second counter is treated and filtered to provide a pure sinusoidal reference waveform to be sampled in a sample/hold detector arrangement. From the comparator arrangement sampling pulses are derived in accordance with the rotational position of the antenna relative to the digital reference as represented by the count in the second counter, with these sampling pulses then being applied to the sample/hold detector in order to produce a sine of azimuth waveform. A cosine of azimuth waveform is also derived via an adder stage in conjunction with the comparator arrangement, which adder counts the equivalent of 90° from the first derived sine sampling pulse to produce the priming condition for a cosine sampling pulse.

3,731,301

METHODS OF DETECTING ROTATION SPEED

John Christopher Hammond Davis, Taplow, England, assignor to Plessey Handel Und Investments A.G., Zug, Switzerland

Filed July 6, 1971, Ser. No. 159,890
Int. Cl. G08c 9/06
U.S. Cl. 340—347 P 15 Claims



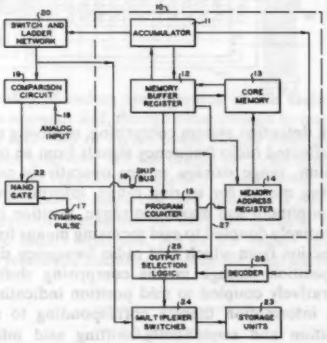
Apparatus, preferably fluidic, for providing a control signal indicative of any deviation of the speed of movement of a jet engine or other moving object from a desired speed, comprising a code disc rotated at a speed proportional to the speed of rotation of the jet engine, logic means which cyclically samples the tracks on the code disc at equal time intervals and produces an output signal if the difference between two successive samples is more than a predetermined amount, and integration means which receives and integrates said output signals to provide said control signal. The control signal may be applied to a valve controlling the supply of fuel to the engine so as to govern the engine speed.

3,731,302

DIGITAL/ANALOG CONVERSION SYSTEM

Harold M. Neer, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 14, 1970, Ser. No. 71,903
Int. Cl. H03k 13/02
U.S. Cl. 340—347 AD 5 Claims

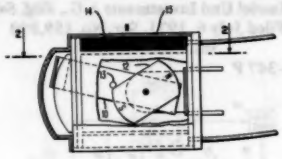


A general purpose computer is utilized for analog to digital conversion by utilizing a switch and ladder network which cooperates with a comparison circuit and a gate to perform a conversion subroutine in the computer. Several analog inputs can be successively converted to digital form and stored in core memory. These input values, or computed values, can further be transferred to analog storage units for recording, by utilization of multiplexer switches having their output selection logic controlled by the computer program.

3,731,303
MAGNETIC LATCHING INDICATOR

Harry E. Wohlbach, Allentown, Pa., assignor to Electro Mechanical Instrument Company, Inc., Perkasie, Pa.

Filed May 5, 1970, Ser. No. 34,720
Int. Cl. G08b 5/22
U.S. Cl. 340—373 R 8 Claims

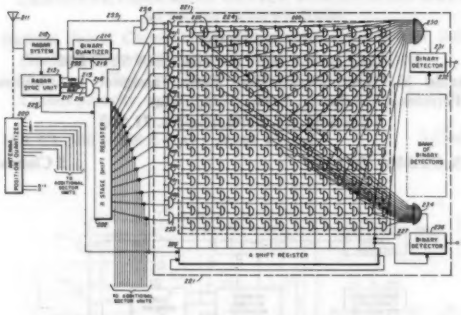


In an indicator having a moving permanent magnet mounted on an arbor, a pointer is mounted on the arbor for rotation independent of the rotation of the moving magnet. This moving permanent magnet engages a projection on the pointer during a portion of its rotation. A control permanent magnet is positioned with its poles lying in the plane of the first permanent magnet poles to latch the moving permanent magnet by repulsion upon rotation in one direction or the other.

3,731,304
TRACK-BEFORE-DETECT SYSTEM

James W. Caspers, and Carlos Nuese, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy

Filed Sept. 8, 1961, Ser. No. 137,944
Int. Cl. G01s 9/14
U.S. Cl. 343—5 DP 13 Claims

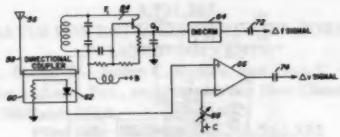


1. A track detection system comprising; receiving means for receiving reflected radio frequency signals from an object in a given medium, range storage means operatively coupled to said receiving means for storing range, information therein between a minimum and maximum range, position indicating means operatively coupled to said receiving means for indicating the direction from which said radio freuqency signals are received, position storage means comprising shift register means operatively coupled to said position indicating means for storing information therein corresponding to receiving means position and sequentially shifting said information through said register with respect to time, coincidizing means operatively coupled to said range storage means and said position storage information and producing outputs therefrom when data corresponding to a particular range and a particular position of the receiving means are coincident therein, said coincidence means being operative to perform a cross-correlation with a class of possible tracks; counting means operatively coupled to said coincidizing means for counting a number of outputs from said coincidizing means and performing a decision as to the presence or absence of an object for each test track.

3,731,305
OBJECT DETECTION SYSTEM USING ELECTRO MAGNETIC WAVES

John B. Gehman, San Diego, Calif., assignor to General Dynamics Corporation, San Diego, Calif.

Filed Dec. 9, 1971, Ser. No. 210,264
Int. Cl. G01s 9/42
U.S. Cl. 343—5 PD 32 Claims

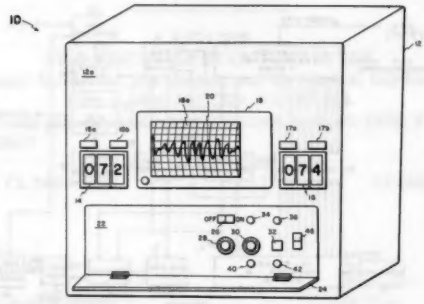


Objects such as personnel and vehicles are detected when they enter a sensing field produced by an antenna which is excited by oscillators operating in the VHF frequency band by producing cyclic variations in the frequency and in the amplitude of the oscillators exciting signal, which variations are in approximately quadrature phase relationship. The system responds to the correlation between the amplitude and the phase variation so as to produce an alarm indication of both the presence of an intruding object and its direction of movement, either toward or away from sensing the antenna.

3,731,306
SEA STATE ANALYZER USING RADAR SEA RETURN

George F. Andrews, Miami, Fla., assignor to The United States of America as represented by the Secretary of the Navy

Filed Jan. 24, 1972, Ser. No. 220,089
Int. Cl. G01s 7/04, 9/02
U.S. Cl. 343—5 R 8 Claims



A sea state analyzer samples sea clutter video from a selected range at the radar pulse repetition rate and passes the sample through an active filter to provide ocean wave analog voltage signals which are recorded. Circuitry is described which derives from the analog voltage signals and from clock signals, the average wave time period for waves of each group having a predetermined number of waves. One digital display shows the average for the last group computed while another shows the average being developed for a current group.

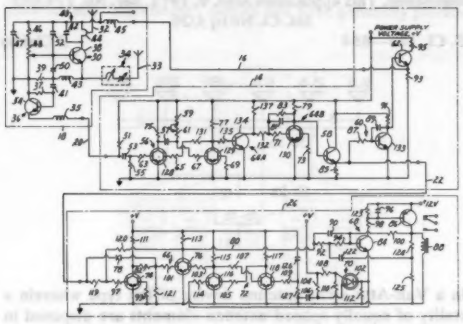
3,731,307
ELECTRICAL DETECTING MEANS

Lincoln H. Charlot, Jr., Saint Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 817,081, April 21, 1969, abandoned.
This application July 9, 1971, Ser. No. 161,917
Int. Cl. G01s 9/42; G08b 13/22
U.S. Cl. 343—7.5 16 Claims

A pulsed mode radar detector the pulse repetition rate of which is a function of environment and moving object reflected signals which has a negative feedback voltage regula-

tor for maintaining the radar detector pulse rate constant from one environment to another. The detector pulse interval is essentially constant but the interpulse interval, for a given supply voltage, varies according to the reflected signal phase



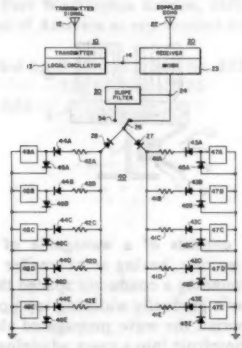
and amplitude. The negative feedback voltage regulator compensates for a change in the environment reflected signal to provide a constant duration interpulse interval from one environment to another.

3,731,308

SUBAUDIBLE FREQUENCY INDICATOR FOR DOPPLER RADAR

Richard S. Felner, Barnegat, N.J., assignor to The United States of America as represented by the Secretary of the Army

Filed June 10, 1971, Ser. No. 151,662
Int. Cl. G01s *9/42*, *9/44*
U.S. Cl. 343—7.7 **7 Claims**



This invention relates to doppler-radar indicating systems and particularly to a system for detecting and indicating doppler beat frequencies in the extremely low frequency range. In this system, a series of lights are actuated by relatively small changes in voltage to clearly indicate a very-slowly-changing alternating voltage.

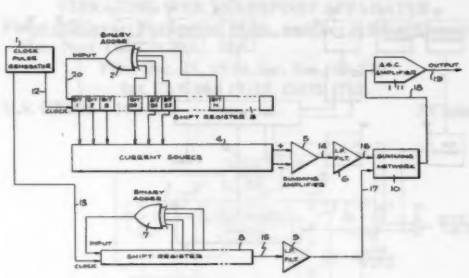
3,731,309

DOPPLER RADAR SIMULATOR

Bennett A. Meyer, Port Chester; Thomas A. Burns, New York, and Peter Anelli, Ossining, all of N.Y., assignors to The Singer Company, Little Falls, N.J.

Filed Nov. 8, 1971, Ser. No. 196,326
Int. Cl. G01s *7/40*
U.S. Cl. 343—17.7 **9 Claims**

A Doppler radar simulator is provided for generating signals for testing Doppler radar navigational systems. The Doppler simulator of the invention utilizes digital techniques in order to perform with the required high degree of accuracy and precision for the proper simulation of Doppler radar naviga-



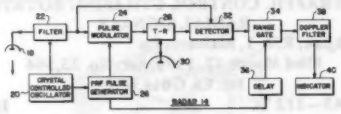
tional system. The simulator of the invention utilizes shift registers and other components to generate, on a digital basis, the required Doppler simulation signals and wide band background noise.

3,731,310

OPERATING PROXIMATE RADARS WITH INTERLACED SPECTRAL LINES

Otto E. Rittenbach, Neptune, N.J., assignor to The United States of America as represented by the Secretary of the Army

Filed June 30, 1971, Ser. No. 158,358
Int. Cl. G01s *9/02*
U.S. Cl. 343—17.1 R **9 Claims**



A plurality of radars are operated in the same electronic spectrum segment and, though close enough to one another to intercept reflected or direct beam energy from one another, they do not interfere. All the radars are coherently pulsed at the same pulse repetition frequency. Their carrier frequencies differ by frequency steps that are equal to a fraction of the pulse repetition frequency so that the spectral lines of the respective radars interlace. All of the radars may utilize a common reference frequency source for their carrier frequencies.

3,731,311

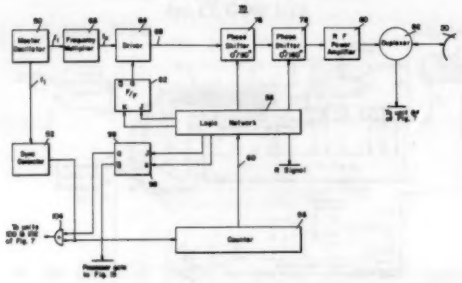
POLYPHASE ENCODING-DECODING SYSTEM

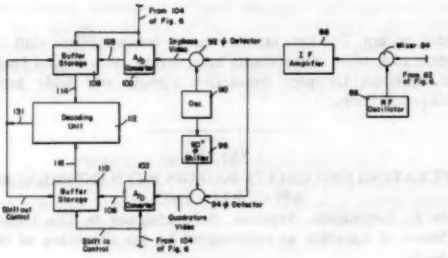
Frederick C. Williams, Topanga, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Sept. 18, 1970, Ser. No. 73,470
Int. Cl. G01s *17/32*
U.S. Cl. 343—17.2 PC **26 Claims**

A polyphase pulse compression system for simultaneously decoding and amplitude weighting groups of sequentially applied phase encoded signals. For a phase encoded signal group of N^2 signal elements the decoded amplitude weighted value of a particular signal group is formed by modifying only N

stored sub-accumulation signals from the preceding decoding cycle. Dual processing storage channels associated with each





sub-accumulation signal are alternately cleared to reduce processor error "build-up."

3,731,312

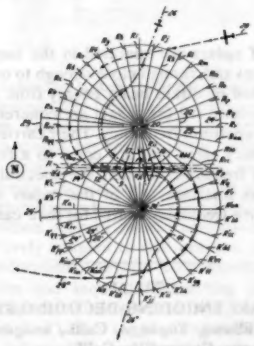
AIR TRAFFIC CONTROL UTILIZING ROTATING RADIAL SIGNALS

Haig Kurkjian, R.D. 1, Malvern, Pa.

Filed March 27, 1970, Ser. No. 23,344

Int. Cl. G01s *3/02*

U.S. Cl. 343—112 TC **16 Claims**



Air traffic is controlled to follow azimuthally rotating radial signals, from an off-airport terminal omnirange station, sweeping over an air-port in a direction and at a speed suitable for approach to landing. Dual omnirange stations flanking the airport may be used similarly for control of traffic to respective dual runways or for control of departure after takeoff as well as approach to landing.

3,731,313

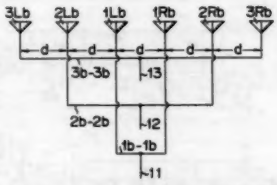
VAN-ATTA ARRAY ANTENNA DEVICE

Kiyoshi Nagai, Yokohama-shi, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan

Continuation-in-part of Ser. No. 868,415, Oct. 22, 1969, abandoned. This application Sept. 9, 1971, Ser. No. 179,053

Int. Cl. H01q *3/26*

U.S. Cl. 343—854 **2 Claims**



In a Van-Atta array antenna device of the type wherein a plurality of equally spaced antenna elements are disposed in parallel and respective pairs of antenna elements disposed symmetrically with respect to the center of the antenna array are interconnected by feeders of substantially the same length, impedance matching stubs having an adjustable length are connected to substantially the center of respective feeders in order to enable incoming electromagnetic waves to be reradiated either straight backward or in an opposite direction to that in which they are receiving, with respect to the antenna boresight, without changing the characteristic impedance of feeders.

3,731,314

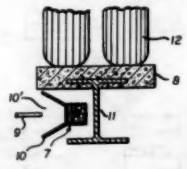
VEHICULAR COMMUNICATIONS SYSTEMS

Theodore Hafner, 1501 Broadway, New York, N.Y.

Filed March 24, 1971, Ser. No. 127,588

Int. Cl. H01q *1/32*

U.S. Cl. 343—717 **8 Claims**



This invention consists of a waveguide of substantially trapezoidal cross section, having at its smaller end a closed base portion, surrounding a conductor spaced therefrom, and exteding therefrom a gradually widening top portion open at its outer end to permit the wave propagated along the wave guide to emerge therefrom into a space adjoining said top portion.

3,731,315

CIRCULAR ARRAY WITH BUTLER SUBMATRICES

Boris Sheleg, Ft. Washington Estates, Md., assignor to The United States of America as represented by the Secretary of the Navy

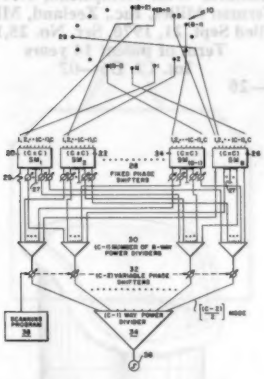
Filed April 24, 1972, Ser. No. 247,087

Int. Cl. H01q *3/26*

U.S. Cl. 343—854 **4 Claims**

Several small Butler matrices are interconnected in a manner to replace a large Butler matrix employed in a beam forming and scanning network for a circular antenna array. This system of Butler submatrices (a set of low order Butler matrices simulating a single higher order Butler matrix) permits a reduction in the size of an existing feed system without any sacrifice in the 360° beam steering capability. Also this system produces only a minimal loss in beamwidth. A major

difference between this system and the systems of the prior art is the number of modes available. For this instant submatrix feed system, the number of available modes is at most, one-half of that in the well known single Butler matrix system. The additional modes in the single Butler matrix system of the prior art are "high order" modes and have generally produced



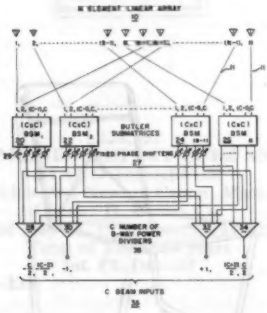
poor quality far field patterns. As a result only a small percentage of these modes could be used in practice. Hence for most applications, the two systems provide essentially the same performance with the submatrix feed system being more economical since it is simpler, requires less hardware, and is more efficient in that all but one of the available modes are high quality modes.

3,731,316

BUTLER SUBMATRIX FEED FOR A LINEAR ARRAY

Boris Sheleg, Fort Washington Estates, Md., assignor to The United States of America as represented by the Secretary of the Navy

Filed April 25, 1972, Ser. No. 247,426
Int. Cl. H01q *3/26*
U.S. Cl. 343—854 **5 Claims**



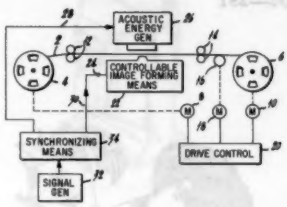
Several small Butler matrices are interconnected in a manner to replace a large single Butler matrix employed in a beam forming and scanning network for a linear array. This system of Butler submatrices (a set of low order Butler matrices simulating a single higher order Butler matrix) permits reduction in the size of existing feeding systems, which results in a substantial savings of system components and hardware. The function of this submatrix feed system is substantially identical to that of the single multibeam matrix network in most respects except for a fewer number of available beams. Also, this submatrix feed system is capable of exciting linear arrays which cannot presently be excited by a single Butler matrix. Also, the system has application in satellite communications and direction finding equipment.

3,731,317

VIBRATING WEB TRANSPORT APPARATUS

Pieter deBruyne, Burlington, Mass., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 21, 1970, Ser. No. 100,279
Int. Cl. G01d *15/28*; G03b *1/48*
U.S. Cl. 346—107 R **3 Claims**



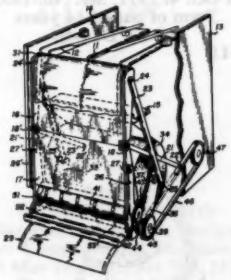
A technique for providing information transducing with a moving optical record medium so that a desired transducing resolution is achieved while preventing abrasion damage to the recording medium and build up of foreign substances in the information interface. This is accomplished by vibrating the medium into intermittent contact with an image forming means, which is enabled only during the contacting relation, to transduce information with the recording medium.

3,731,318

PAPER TRANSPORT STRUCTURE FOR RECORDER COMPRISING FOLDABLE FACE PLATE

K. Shirlan Dickey, North Ogden, Utah, assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed May 25, 1972, Ser. No. 256,859
Int. Cl. G01d *15/24*
U.S. Cl. 346—145 **18 Claims**



A recorder utilizing a recording medium such as paper threaded over a front face plate where the recorded signals may be viewed, the front face plate being formed by two separate plate sections which may be folded at a central region to produce an opening in the front of the recorder for loading and unloading the paper supply roll. The mechanical linkage for moveably supporting the face plate sections on the recorder chassis also carries a moveable paper supply support structure, the support structure moving forwardly as the front plate is folded such that the access to the supply roll support is substantially enhanced. The threading path for the paper is extremely simple with the two face plate sections in the folded condition, the unfolding operation of the face plate sections serving to carry the paper into engagement with the paper drive mechanism. The paper drive mechanism remains in engagement with the main drive train during the paper loading operation.

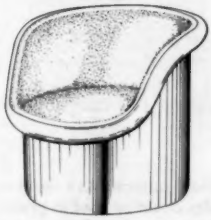
DESIGNS

MAY 1, 1973

226,791
HAT
Eleanor R. Schaller, 364 W. Heather Court, Eau Claire, Wis. 54701
Filed Nov. 15, 1971, Ser. No. 199,080
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—251

226,792
GOLF BOOT
Clara H. Gault, 1218–B Greenoaks Lane, Charlotte, N.C. 28201
Filed Oct. 4, 1971, Ser. No. 186,591
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—311

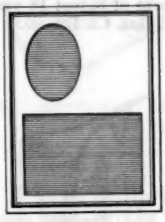
226,793
SEAT
Donald Watamura, West Hempstead, N.Y., assignor to Herman Miller, Inc., Zeeland, Mich.
Filed Sept. 21, 1970, Ser. No. 25,123
Term of patent 14 years
Int. Cl. D6—*02*
U.S. Cl. D6—20



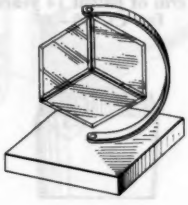
226,794
CHAIR
Gerry D. Welton, 910 E. Tripp, Peoria, Ill. 61603
Filed July 14, 1971, Ser. No. 162,759
Term of patent 14 years
Int. Cl. D6—*02*
U.S. Cl. D6—66

226,795
PORTABLE CUSHION
Andrew Johnson, 3140 N. 12th St., Philadelphia, Pa. 19133
Filed Aug. 5, 1970, Ser. No. 24,310
Term of patent 14 years
Int. Cl. D6—*09*
U.S. Cl. D6—201

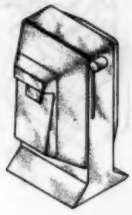
226,796
PICTURE FRAME
Richard L. Shinnick, 10659 Cranks Road, Culver City, Calif. 90230
Filed Apr. 6, 1972, Ser. No. 241,879
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—234



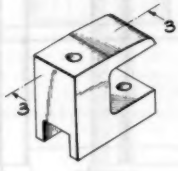
226,797
COMBINED DISPLAY CUBE AND STAND THEREFOR
Marshall C. Schneider, Newton Center, Mass., assignor to Charles D. Barnes Co.
Filed May 26, 1971, Ser. No. 147,294
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—235



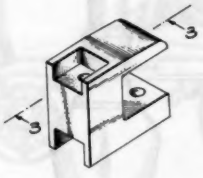
226,798
CAN OPENER
Samuel J. Mann, Englewood, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Oct. 14, 1971, Ser. No. 189,486
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D8—36



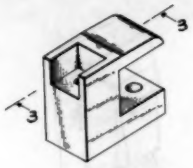
226,799
BEAM CLAMP BODY
Raymond M. Rumble, Girard, Ohio, assignor to Michigan Hanger Company, Inc., Hubbard, Ohio
Filed May 10, 1972, Ser. No. 252,151
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—235



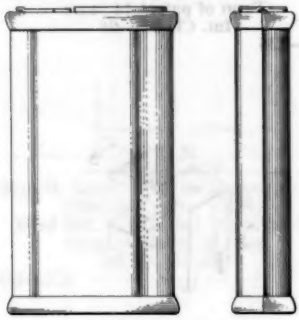
226,800
BEAM CLAMP BODY
Raymond M. Rumble, Girard, Ohio, assignor to Michigan Hanger Company, Inc., Hubbard, Ohio
Filed May 10, 1972, Ser. No. 252,152
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—235



226,801
BEAM CLAMP BODY
Raymond M. Rumble, Girard, Ohio, assignor to Michigan Hanger Company, Hubbard, Ohio
Filed May 10, 1972, Ser. No. 252,154
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—235

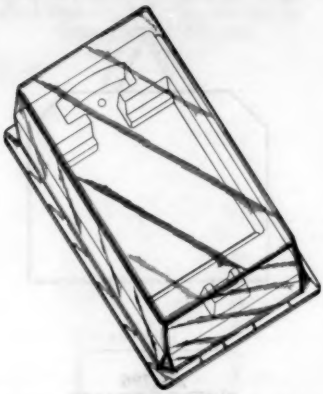


226,802
DISPENSING CONTAINER
John B. Ames, Box 670, Marion, Ala. 36256
Filed Sept. 15, 1971, Ser. No. 180,946
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—71

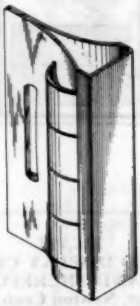


226,803
BOTTLE
Frank E. Wood, 700 E. 1st St., Tulsa, Okla. 74120
Filed Oct. 20, 1971, Ser. No. 191,142
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—139

226,804
RAZOR CASE
Donald A. Leathers, South Easton, Mass., assignor to The Gillette Company, Boston, Mass.
Filed Apr. 24, 1972, Ser. No. 247,259
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—186

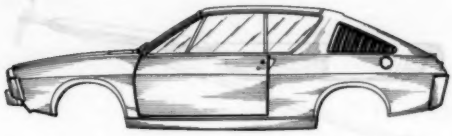


226,805
PACKAGE OF MUGS
Bela B. Neval, Dobbs Ferry, N.Y., assignor to Nevco Products Co., Inc.
Filed June 18, 1971, Ser. No. 154,710
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—193

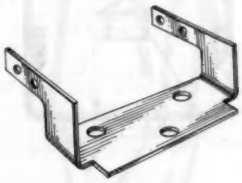


226,806
DISPENSING CLOSURE
Robert E. Hazard, North Kingstown, R.I., assignor to Polytop Corporation, Slatersville, R.I.
Filed Aug. 2, 1971, Ser. No. 168,533
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—275

226,807
VEHICLE BODY
Michel Tixier, Billancourt, France, assignor to Regie Nationale des Usines Renault, Billancourt, France
Filed Nov. 15, 1971, Ser. No. 199,088
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D14—3 G

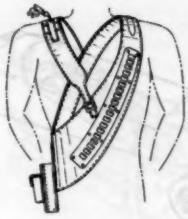


226,808
TRAILER HITCH PLATE
Richard W. Rollins, Joliet, Ill., assignor to Nash Bros. Co., Joliet, Ill.
Filed Mar. 4, 1971, Ser. No. 121,231
Term of patent 14 years
Int. Cl. D12—*10, 16;* D8—*08*
U.S. Cl. D14—6 C

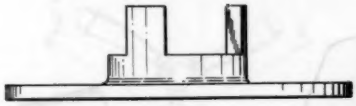


226,809
CART
Gilbert A. Cummings, Norwell, and William J. Hannon, Cohasset, Mass., assignors to Peters & Company, Inc., Boston, Mass.
Filed May 15, 1971, Ser. No. 124,643
Term of patent 14 years
Int. Cl. D12—*14*
U.S. Cl. D14—6 M

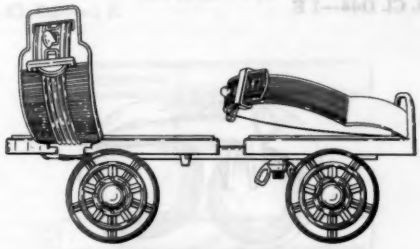
226,810
GUN CARRIER
Ralph Winfrey, 7012 Lexington Ave., St. Louis, Mo. 63121
Filed Apr. 28, 1972, Ser. No. 248,781
Term of patent 14 years
Int. Cl. D22—*99*
U.S. Cl. D22—13



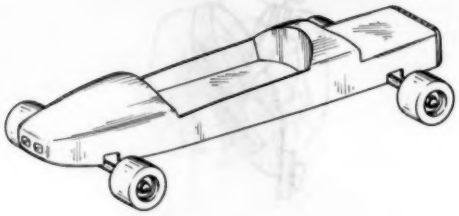
226,811
CASSETTE REEL MOTION INDICATOR
John M. Baker, San Clemente, Calif., assignor to Cassette Magnetics Corporation, doing business as American Cassette Corporation, Inglewood, Calif.
Filed Nov. 12, 1971, Ser. No. 198,491
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14 B



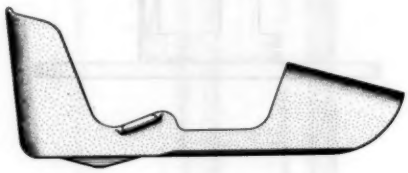
226,812
ROLLER SKATE
Choy Cheung Tat, Kowloon, Hong Kong, assignor to Grace Artificial Jewellery Manufacturing Co. Ltd., Kowloon, Hong Kong
Filed June 7, 1971, Ser. No. 150,884
Claims priority, application Great Britain Apr. 21, 1971
Term of patent 7 years
Int. Cl. D21—*01*
U.S. Cl. D34—14 C



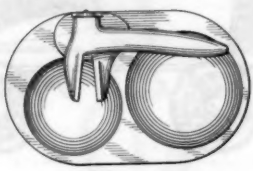
226,813
ORNAMENTAL SKATEBOARD
Lawrence C. French, 8267 Buffalo Ave., Norfolk, Va. 23518
Filed Dec. 6, 1971, Ser. No. 205,480
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



226,814
SLED
Leonard R. Gaylord, Gates, N.Y., assignor to International Valide Corp., Rochester, N.Y.
Filed Feb. 4, 1972, Ser. No. 223,811
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—15 AK

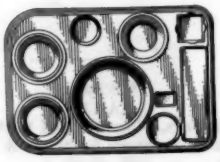


226,815
COMBINED NUTCRACKER AND BOWL
Joel T. Hartmeister, P.O. Box 268, Aspen, Colo. 81611
Filed June 14, 1971, Ser. No. 153,162
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D44—1 E



226,816
FRYING PAN
Fred Press, White Plains, N.Y., assignor to House Mates, Inc., Hartsdale, N.Y.
Filed June 23, 1971, Ser. No. 156,165
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D44—1 J

226,817
COVERED SERVING TRAY
William A. Madalin, Franklin, Mich., assignor to American Supply Corporation, Evanston, Ill.
Filed Oct. 21, 1971, Ser. No. 191,567
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D44—10 E



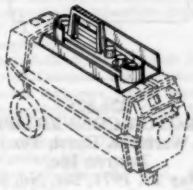
226,818
COMBINED FLASHLIGHT AND DETACHABLE PUMPKIN MASK THEREFOR
Perry Feuer, Roslyn, N.Y., assignor to Creative Creations, Inc., New York, N.Y.
Filed Feb. 25, 1971, Ser. No. 119,075
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D48—24 A

226,819
GAS LOG LIGHTER
Carl A. Sundstrom, deceased, late of Torrance, Calif., by Carl C. Sundstrom, administrator, 1700 Via Arriba, Palos Verdes Estates, Calif. 90274
Filed July 15, 1971, Ser. No. 163,126
Term of patent 14 years
Int. Cl. D26—*99*
U.S. Cl. D48—27 C

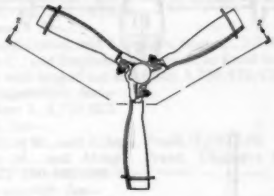
226,820
POST TOP COLONIAL LUMINAIRE
John B. Arens, Cleveland, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Oct. 5, 1971, Ser. No. 186,595
Term of patent 14 years
Int. Cl. D26—*03*
U.S. Cl. D48—31

226,821
HEEL REST FOR ELECTRIC IRON
Masatoshi Naito, Ikeda, and Yukio Hirano, Mino, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed June 18, 1971, Ser. No. 154,704
Claims priority, application Japan Dec. 24, 1970
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D49—6 A

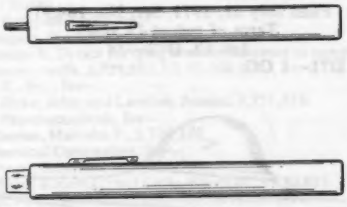
226,822
TOOL HOLDER FOR VACUUM CLEANER OR THE LIKE
Julian R. Haynes, Hinsdale, Ill., assignor to Sunbeam Corporation, Chicago, Ill.
Filed July 12, 1971, Ser. No. 161,372
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D49—17



226,823
IMPELLER FOR MIXING LIQUIDS OR THE LIKE
George Gustaf Landberg, Rochester, N.Y., assignor to Mixing Equipment Co., Inc., Rochester, N.Y.
Filed Oct. 5, 1970, Ser. No. 25,342
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D55—1 D

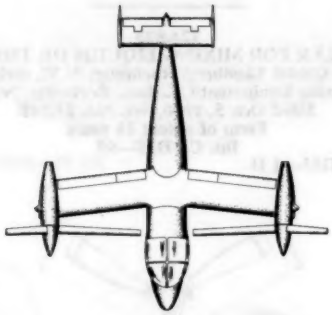


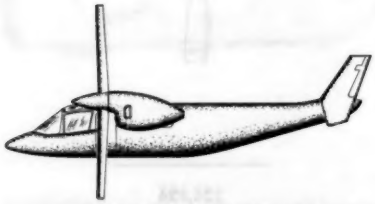
226,824
OPHTHALMIC SLIT LAMP
David E. Staub, Clearwater, Fla., assignor to Concept, Inc., St. Petersburg, Fla.
Filed Mar. 31, 1971, Ser. No. 130,047
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D57—1 E



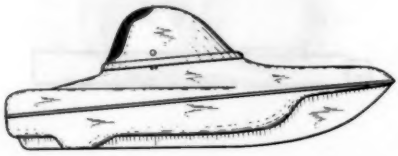
226,825
TANK CAR BODY
Jack Hickman, 5766 Fair Oaks Blvd., Carmichael, Calif. 95608
Filed Mar. 1, 1971, Ser. No. 119,996
Term of patent 14 years
Int. Cl. D12—*03*
U.S. Cl. D66—1

226,826
TILT ROTOR CONVERTIPLANE
Kenneth G. Wernicke, Hurst, Tex., assignor to Textron Inc.
Filed May 17, 1971, Ser. No. 144,358
Term of patent 14 years
Int. Cl. D12—*07*
U.S. Cl. D71—1 N





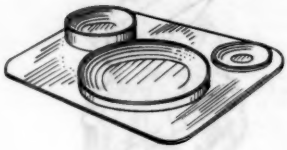
226,827
WATER CRAFT
Laurence L. Lampert, New York, N.Y., and Arthur B. Joyal, Bristol, R.I., assignors to Minijet Sportscrafts Inc., New York, N.Y.
Filed July 21, 1971, Ser. No. 164,971
Term of patent 14 years
Int. Cl. D12—*14*
U.S. Cl. D71—1 CC



226,828
RESUSCITATING DEVICE
Norman H. Stensager, 11032 Harrison Ave. S., Minneapolis, Minn. 55431
Filed Mar. 11, 1971, Ser. No. 123,497
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—1 G

226,829
CORNEAL RUST RING REMOVER
David E. Staub, Clearwater, Fla., assignor to Concept, Inc., St. Petersburg, Fla.
Filed Mar. 31, 1971, Ser. No. 130,048
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—12

226,830
DISPOSABLE MEAL SERVING UNIT
John A. Bridges, Nashville, Tenn., assignor to Aladdin Industries, Incorporated, Chicago, Ill.
Filed Mar. 9, 1971, Ser. No. 122,647
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D44—10



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 1ST DAY OF MAY, 1973

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A-T-O Inc.: *See—*
Latina, Roland N., 3,729,745.

Aagard, Roger L., to Honeywell Inc. Optical mass memory. 3,731,290, Cl. 340-174.0yc.

AAI Corporation: *See—*
Critcher, John L., 3,729,853.

Abbott, Eugene A.: *See—*
Isquith, Alan J.; Abbott, Eugene A.; and Walters, Patrick A., 3,730,701.

Abbott, Thomas I., to Eastman Kodak Company. Developer scavengers for image transfer systems. 3,730,713, Cl. 96-3.000.

Abbott, Thomas Irving, to Eastman Kodak Company. Silver halide color photographic element containing a magenta color coupler and a carboxy substituted thiazoline compound. 3,730,724, Cl. 96-74.000.

Abildgaard Laboratories, Inc.: *See—*
Abildgaard, William H.; and Groswith, Charles T., III, 3,730,560.

Abildgaard, William H.; and Groswith, Charles T., III, to Abildgaard Laboratories, Inc. Method of forming and casing books and product thereof. 3,730,560, Cl. 281-21.000.

Accumed, Inc., mesne: *See—*
Buddecke, Charles L.; and LeValley, John, 3,730,172.

ACF Industries, Incorporated: *See—*
Coyle, Edward L.; and Schipper, Dennis J., 3,731,053.

Ackermann, Ernst: *See—*
Espeel, Frans Joris; and Ackermann, Ernst, 3,729,903.

Acme-Cleveland Corporation: *See—*
Taylor, Samuel K., 3,729,871.

Acs, Steven: *See—*
Sack, John J.; and Acs, Steven, 3,730,551.

Adachi, Kiyoshi: *See—*
Kosaka, Kenzo; Adachi, Kiyoshi; Kitagawa, Hiroshi; Nakamura, Tunehiko; and Kato, Osami, 3,729,831.

Adams, George Edward: *See—*
Beharrell, George David; and Adams, George Edward, 3,730,248.

Adcock, Carolyn P.; and Stewart, Troy L. Educational and recreational device. 3,729,838, Cl. 35-9.00c.

Adkins, Clement J.: *See—*
MacVicar, Margaret L. A.; Freake, Stuart M.; and Adkins, Clement J., 3,731,158.

Adrian, Claire M.: *See—*
Adrian, Robert G.; and Adrian, Claire M., 3,730,390.

Adrian, Robert G.; and Adrian, Claire M., to Tear Gas Products Corporation. Aerosol gun. 3,730,390, Cl. 222-79.000.

Aerojet-General Corporation: *See—*
Frost, Charles B.; and Gisler, Philip S., 3,730,792.

Aerotherm Corporation: *See—*
Kennedy, William S., 3,730,633.

Affri, Ambrogio; and Affri, Giovanni. Fluid propelling system. 3,730,646, Cl. 417-77.000.

Affri, Giovanni: *See—*
Affri, Ambrogio; and Affri, Giovanni, 3,730,646.

Agfa-Gevaert Aktiengesellschaft: *See—*
Bickl, Horst; and Pfeifer, Josef, 3,731,063.
Danhauser, Justus, 3,730,718.
Fliesser, Engelbert, 3,730,616.
Werz, Siegfried; and Zanner, Johann, 3,730,617.

Agie, A.G. fur Industrielle Elektronik: *See—*
Ullmann, Werner; Panschow, Rudolf; Shur, Volker; Meyer, Wolfgang; Sieg, Arno; and Rabian, Laszlo, 3,731,043.
Ullmann, Werner; Rabian, Laszlo; Mattei, Silvano; Sieg, Arno; Suter, Peter; Tadini, Costantino; Panschow, Rudolf; Suhr, Volker; and Meyer, Wolfgang, 3,731,044.
Ullmann, Werner; Rabian, Laszlo; Mattei, Silvano; Sieg, Arno; Suter, Peter; Tadini, Costantino; Panschow, Rudolf; Suhr, Volker; and Meyer, Wolfgang, 3,731,045.

Ahldea Corporation: *See—*
Deaton, David W., 3,730,173.

Ahrland, Sten Harald; Carleson, Bengt Goran Fredrik; and Lindhe, Jarl Soren, to Aktiebolaget Atomenergi. Method of purifying water. 3,730,886, Cl. 210-37.000.

Air Preheater Company, Inc., The: *See—*
Wixson, Donald F.; and Ostrander, George K., 3,730,259.

Air Products and Chemicals, Inc.: *See—*
Uffner, Melville W., 3,730,924.

Air Reduction Company, Incorporated: *See—*
Nicol, James, 3,730,967.

Airco, Inc.: *See—*
Norwalk, Marshall H., 3,730,962.

Aisin Seiki Company, Limited: *See—*
Nakashima, Katsushi, 3,729,932.

Aizawa, Tsuneo, to Amada Co., Ltd. Method to control the feeding amount in band sawing machines. 3,730,033, Cl. 83-13.000.

Akashi, Goro; Fujiyama, Masaaki; and Miyake, Tokuaki, to Fuji Photo Film Co., Ltd. Undercoating composition for a magnetic recording medium. 3,730,767, Cl. 117-239.000.

Akhunov, Albert Musagitovich: *See—*
Maksutov, Rafkhat; Asfandiyarov, Khalim Akhmetovich; Pashin, Vasily Fedorovich; Gubarev, Yakov Fedorovich; Sadykov, Rifgat Suleimanovich; Akhunov, Albert Musagitovich; Vakhitov, Gadel Galyautdinovich; Graifer, Valery Isaakovich; Zyalyaev, Vagiz Murzakhanovch; Kostrjukov, Gennady Vasilievich; and Efanov, Boris Fedorovich, 3,729,803.

Akimtsev, Gennady Vasilievich: *See—*
Tarnopolsky, Igor Fafailovich; and Akimtsev, Gennady Vasilievich, 3,729,837.

Akin, Minnie Izetta, to Penny Enterprises, Ltd. Coin operated ironing board with safety and return features. 3,730,321, Cl. 194-9.00t.

Akiyama, Keiiti; and Makino, Kiyoji, to Tokyo Shibaura Electric Co., Ltd. Heat resistive resin composition comprising an epoxy, organic acid anhydride, and maleimide. 3,730,948, Cl. 260-47.0ec.

Aktiebolaget Atomenergi: *See—*
Ahrland, Sten Harald; Carleson, Bengt Goran Fredrik; and Lindhe, Jarl Soren, 3,730,886.

Aktiebolaget Svenska Flaktfabriken: *See—*
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Aktiengesellschaft Brown, Boveri & Cie: *See—*
Richard, Robert, 3,730,463.
Szente-Varga, Hermann Paul, 3,730,968.

Albany, Stanley J. Ventilated awning. 3,729,874, Cl. 52-78.000.

Albers, Edwin W.; and Edwards, Grant C., to Grace, W. R., & Co. Novel zedlite surfaces. 3,730,910, Cl. 252-455.00z.

Albers, Walter A., Jr.; Bleil, Carl E.; and Swets, Don E., to General Motors Corporation. RF sputtering of tetragonal germanium dioxide. 3,730,867, Cl. 204-192.000.

Albertsen, Hans C.: *See—*
Burns, Bland Calvin; and Albertsen, Hans C., 3,730,884.

Albinson, Don C.; and Stephens, William I., to Knoll International, Inc. Storage unit with hinged top and front. 3,730,378, Cl. 220-29.000.

Alcotronics Corporation: *See—*
Loftus, Peter J., 3,731,022.

Aldape, Frank: *See—*
Aldape, Tony M.; and Aldape, Frank, 3,730,556.

Aldape, Tony M.; and Aldape, Frank. Champer hitch extension. 3,730,556, Cl. 280-500.000.

Alfeev, Ivan Ivanovich: *See—*
Daiker, Artur Lvovich; Morozov, Alexandr Nikolaevich; Veis, Anatoly Ivanovich; Kushtuev, Boris Grigorievich; Novoselov, Nikolai Mikhailovich; Zhuravlev, Viktor Nikolaevich; Zinoviev, Alexei Fedorovich; Alfeev, Ivan Ivanovich; Nikitin, Viktor Ivanovich; Kocergin, Alexei Ilich; Matashkov, Vladimir Filippovich; Karelin, Nikolai Ivanovich; Volchematiev, Jury Venediktovich; Zaluzhentsev, Veniamin Fedorovich; and Morozov, Gennady Yakovlevich, 3,730,504.

Alimena, James J.: *See—*
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Alkasarov, Jury Innokentievich: *See—*
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Tkach, Khaim Berkovich; Nazarov, Nikolai Grigorievich; Malbert, Petr Eduardovich; Lavron, Nikolai Sergeevich; Alkasarov, Jury Innokentievich; Legeche, Nikolai Leontievich; Golbinshtein, Alexanr Isovich; Reinsburg, Alexandr Mironovich; Burshtein, Mikhail Vladimirovich; Mikushin, Dmitry Pavlovich; Terskov, Alexei Danilovich; and Belov, Leonid Stepanovich, 3,730,283.

All-Steel Equipment Inc.: *See—*
Swanquist, Wesley W., 3,730,466.

Allen, George E. Device for tying wooden members to composite brick and masonry walls. 3,729,882, Cl. 52-300.000.

Allen, R. C., Inc.: *See—*
Van Dyke, John; and Lamfers, Benard, 3,731,213.

Allergan Pharmaceuticals: *See—*
Boghosian, Malcolm P., 3,730,182.

Allied Chemical Corporation: *See—*
Daehnert, Raymond H., 3,730,703.
Formaini, Robert L.; and Little, Edwin D., 3,730,923.
Koch, Paul Joseph; and Lapham, Julie Ann, 3,730,939.
Marshall, Robert Moore; and Dardoufas, Kimon Constantine, 3,730,892.
Sack, John J.; and Acs, Steven, 3,730,551.

Allied Management & Systems Corporation: *See—*

Dancis, Douglas E.; Dorfuss, Gerald E.; and Zitron, Benjamin C., 3,731,282.

Allori, Aldo, to International Harvester Company. Tractor weights. 3,730,545, Cl. 280-150.00e.

Allred, Victor D., to Marathon Oil Company. Shale oil recovery from fractured oil shale. 3,730,270, Cl. 166-247.000.

Allred, Victor D., to Marathon Oil Company. Integral calcined coke coller. 3,730,849, Cl. 202-103.000.

Allsop, Ivor J. Strap for boot and shoe holder. 3,729,760, Cl. 12-120.500.

Alpert, Norman: *See—*
Berler, Robert M.; Alpert, Norman; and Murthy, Nanjudiah N., 3,731,064.

Alto Company: *See—*
Irving, Frank M., Jr.; Schmidt, Albert S., Sr.; Andrus, Ronald G.; and Beckius, Herbert J. P., 3,730,326.

Altshuler, Thomas L. Wafer breaker. 3,730,410, Cl. 225-96.500.

Aluminum Company of America: *See—*
Bowser, John O.; and Moga, Nicholas I., 3,730,140.
Dunn, Lloyd G.; Morran, James R.; and Peters, Donald L., 3,730,383.
Gurganus, Thomas B.; Turnbull, Gordon K.; and Montgomery, Allen M., 3,729,971.

Alvi, Syed M. S.: *See—*
Sell, Victor L.; and Alvi, Syed M. S., 3,729,796.

Alvino, William M., to Westinghouse Electric Corporation. Polyimides from tetrahydrofuran-2,3:4,5-tetracarboxylic acid dianhydride. 3,730,941, Cl. 260-47.0cp.

ALZA Corporation: *See—*
Higuchi, Takeru, 3,729,947.
Leeper, Harold M.; and Ramwell, Peter W., 3,730,835.

Amada Co., Ltd.: *See—*
Aizawa, Tsuneo, 3,730,033.

Amaro, Angel Garcia: *See—*
Blachut, Theodore J.; Paulun, Manfred; Ferry, Kirk; and Amaro, Angel Garcia, 3,729,830.

Ambrose, Alwin W.; and Nelson, Hersey B., to Combustion Engineering Inc. Temporary support lug system on hanger tubes for erection of pressure parts. 3,729,797, Cl. 29-200.00p.

American Can Company: *See—*
Brincks, Richard Joseph, 3,730,377.
Cook, Russell John; Kuehl Donald Roy; and Mueller, David Charles, 3,730,738.

American Cyanamid Company: *See—*
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American Optical Corporation: *See—*
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American Science & Engineering Inc.: *See—*
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American Standard, Inc.: *See—*
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American Thermostat Corporation: *See—*
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Ametek, Inc.: *See—*
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A.M.H. Equipment, Inc.: *See—*
Harper, William H.; Peace, Charles R.; and Keller, Jake B., 3,730,396.

Ammann, Hans Hugo, to Bell Telephone Laboratories, Incorporated. Inertia-compensated A.C. biased hydrophone incorporating a porous capacitance transducer. 3,731,266, Cl. 340-8.0lf.

Ammco Tools Inc.: *See—*
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Amoco Production Company: *See—*
Landrum, Ralph A., Jr., 3,731,268.

AMP Incorporated: *See—*
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Ampex Corporation: *See—*
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Zimmermann, Ernest F., 3,730,043.

Amsted Industries Incorporated: *See—*
Hood, Charles N., II, 3,730,104.

Anchor Hocking Corporation: *See—*
Goodwin, Robert C., 3,730,325.

Anchor Plastics Company, Inc.: *See—*
Bhatia, Mahesh, 3,730,035.

Anderson Bros. Mfg. Co.: *See—*
Stohlquist, Roger H., 3,729,894.

Anderson, Clifford J.: *See—*
Peterson, Reuben W.; Backus, Harold A.; and Anderson, Clifford J., 3,731,101.

Anderson, Floyd R.; and Sullivan, Donald N., to Gardner-Denver Company. Rock drill bit guide and mast stabilizer. 3,730,285, Cl. 175-220.000.

Anderson, James H. Heat pump. 3,730,263, Cl. 165-86.000.

Anderson Power Products, Inc., mesne: *See—*
Sharaf, Harold M.; and Eby, Richard L., 3,731,189.

Andersson, Leif, to Siccor Ltd. Freight aircraft loading and unloading plant. 3,730,359, Cl. 214-38.00d.

Ando, Sadao, to Yamatake Honeywell Co., Ltd. Releasable locking mechanism for pushbutton switch with pilot-lamp assembly. 3,731,028, Cl. 200-167.00a.

Andrew, Eugene A., to Olin Corporation. Safety system for explosive powder storage bin. 3,730,049, Cl. 86-1.000.

Andrews, George F., to United States of America, Navy. Sea state analyzer using radar sea return. 3,731,306, Cl. 343-5.00r.

Andrus, Ronald G.: *See—*
Irving, Frank M., Jr.; Schmidt, Albert S., Sr.; Andrus, Ronald G.; and Beckius, Herbert J. P., 3,730,326.

Anelli, Peter: *See—*
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Anheuser-Busch, Incorporated: *See—*
Kovats, Leslie P., 3,730,925.
McCann, Joseph A., 3,731,159.
Teng, James; Rha, Chokyun; Scallet, Barry L.; and Stubits, Marcella C., 3,730,693.

Annis, Robert E.; and Cheek, Forrest R., to General Motors Corporation. Hydrodynamic device with slipping mechanical clutch. 3,730,315, Cl. 192-3.300.

Aoki, Masayoshi, to Kabushiki Kaisha Daini Keikosha. Watertight watch case and watch. 3,729,924, Cl. 58-90.00r.

Aquavoir Holding Company S.A.: *See—*
Dobell, Curzon, 3,730,120.

Aquino, Herman A.; and Knippel, Willis H., to Pullman Incorporated. Unit train automatic unloading system. 3,730,360, Cl. 214-63.000.

Ar-Ventilation AB: *See—*
Soderlund, Lars; and Moller, Ake, 3,730,072.

Arimitsu, Hidenobu: *See—*
Suzuki, Hidetomo; Arimitsu, Hidenobu; and Tanaka, Shigemasa. 3,730,887.

Arita, Koshei. Heating rollers with axial magnetic force reduction means. 3,731,034, Cl. 219-10.490.

Arlauskas, Alfonsas; and Rogers, Lloyd W., Jr., to General Motors Corporation. Closure latch. 3,730,575, Cl. 292-216.000.

Arlen Mills Inc.: *See—*
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Armco Steel Corporation: *See—*
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Young, John E., 3,730,547.

Armistead, Fontaine C., to Texaco Development Corporation. Method and apparatus for preventing electrostatic fields in large tanks. 3,730,193, Cl. 134-10.000.

Armstrong Cork Company: *See—*
Bobb, Paul D., 3,729,893.
Herweh, John E., 3,730,921.
Kreizel, William J.; and Ciuzio, Richard T., 3,730,109.

Armstrong, Edward T. Waste water treatment system. 3,730,881, Cl. 210-6.000.

Armstrong, Raymond I.: *See—*
Brown, Carlton E.; and Armstrong, Raymond I., 3,730,132.

Armstrong, Warren E.; and Voge, Hervey H., to Shell Oil Company. Hydrazine decomposition catalyst. 3,730,909, Cl. 252-434.000.

Arnett, Lawrence E.; and Billock, Paul J., to Ford Motor Company. Fuel tank insert for admitting preselected pump nozzles. 3,730,216, Cl. 137-588.000.

Arnhold, Hans, to Kopp, Heinrich. Electrical press key device with thermic excess current release. 3,731,027, Cl. 200-157.000.

Arnold, Francis T.: *See—*
Freeman, Lawrence M.; and Arnold, Francis T., 3,730,622.

Arrow-Hart, Inc.: *See—*
Hafer, Paul M., 3,731,256.

Arroyo, Norma Z.; and Seaton, Norman T. Back-of-the-head viewing system. 3,730,612, Cl. 350-305.000.

Arvin Industries, Inc.: *See—*
Kelley, Jerry O., 3,731,292.

Arzberger, William A., to Jet Spray Cooler, Inc. Hot water tank. 3,730,144, Cl. 122-13.00a.

Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
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Iguchi, Takashi; Hayakawa, Shiro; and Ohosawa, Hiroshi, 3,730,837.
Komatsu, Kenichi; Saijo, Akira; Haneda, Katsuji; Kodaira, Ryoji; and Ohsawa, Hiroshi, 3,730,836.

Asano, Kiyozi, to Shinsei Kogyo Co., Ltd. Toy seal amusement device. 3,729,863, Cl. 46-92.000.

Asfandiyarov, Khalim Akhmetovich: *See—*
Maksutov, Rafkhat; Asfandiyarov, Khalim Akhmetovich; Pashin, Vasily Fedorovich; Gubarev, Yakov Fedorovich; Sadykov, Rifgat Suleimanovich; Akhunov, Albert Musagitovich; Vakhitov, Gadel Galyautdinovich; Graifer, Valery Isaakovich; Zyalyaev, Vagiz Murzakhanovch; Kostrjukov, Gennady Vasilievich; and Efanov, Boris Fedorovich, 3,729,803.

Ashland Oil, Inc.: *See—*
Culbertson, Billy M., 3,730,952.

Aslund, Bert Ake; and Liljeqvist, Alf Harald. Method and a device for manufacturing a package containing a plurality of ear-plugs. 3,729,892, Cl. 53-23.000.

Associated Electrical Industries Limited: *See—*
Elliott, Richard M., 3,731,089.

Astrom, Lennart, to Aktiebolaget Svenska Flaktfabriken. Arrangement for air conditioning equipment containing a number of conditioning units. 3,729,950, Cl. 62-259.000.

Athena Controls, Inc.: *See—*
Evalds, Egils, 3,730,819.

Atlantic Richfield Company: *See—*
Kjonaas, Manley, 3,730,895.
Striegler, John H., 3,730,284.
Wunderlich, Donald K., 3,730,694.

Atwood Vacuum Machine Company: *See—*
Marchione, Joseph H., 3,729,772.

Aubin, Gerard; and Yerouchalmi, David, to Commissariat a l'Energie Atomique. Heating element comprising lanthanum chromite and oxidation-resistant silicon compound. 3,730,911, Cl. 252-516.000.

Aupoix, Marcel; and Moisson-Franckhauser, Francois, to Compagnie Generale d'Electricite. Cryogenic cable. 3,730,966, Cl. 174-15.00c.

Ausset, Alain: *See—*
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Automatic Liquid Packaging, Inc.: *See—*
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Avco Corporation: *See—*
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Avid Corporation: *See—*
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Axial Corporation: *See—*
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Babcock & Wilcox Company, The: *See—*
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Bachelder, Albert J.: *See—*
Land, Edwin H.; and Bachelder, Albert J., 3,731,083.

Bachle, Wilfred H.; Segovia, Gilbert; and Parker-Jones, H. Andre, to Philco-Ford Corporation. Tapered compression end fitting. 3,730,564, Cl. 285-115.000.

Bachofen, Willy A.: *See—*
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Backus, Harold A.: *See—*
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Fabian, Wolfgang, 3,730,750.
Oppenlaender, Knut; Liebold, Gert; and Buettner, Egon, 3,730,906.
Schenk, Walter; and Hovemann, Friedrich, 3,730,854.

Bagby, James M., 20% to Lee, Raymond, Organization, Inc., The. Rotating internal combustion engine. 3,730,148, Cl. 123-43.00r.

Bailey, William Douglas: *See—*
Buttle, Robert Leroy; and Bailey, William Douglas, 3,730,969.

Bair, Lester E., to Fairshare Marketing & Manufacturing Co., Inc. Heat sealer. 3,731,054, Cl. 219-243.000.

Baigert, Teddy A.; and Schaffer, William J., to International Business Machines Corporation. Cleaning apparatus and method in a magnetic tap unit. 3,731,289, Cl. 340-174.10r.

Bakker, Roelof Johan, to AMP Incorporated. Diagnostic connector. 3,731,257, Cl. 339-44.00m.

Baldwin, Kenneth B.: *See—*
De Rouen, Joseph R.; Baldwin, Kenneth B.; and Martin, Henry F., 3,729,817.

Ball, David A.: *See—*
Kerchner, Charles F., Jr.; and Ball, David A., 3,731,055.

Ballard, Charles U. Aircraft seat lock actuator. 3,730,019, Cl. 74-502.000.

Ballou, Clayton R. Shoring structure. 3,730,572, Cl. 287-53.500.

Baltimore Brushes, Inc.: *See—*
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Ban, Itsuki. Magnetic tape cartridge removing apparatus. 3,730,533, Cl. 274-4.00f.

Ban, Itsuki. Endless magnetic tape cartridge removing apparatus. 3,730,534, Cl. 274-4.00b.

Barber-Greene Company: *See—*
Flippin, James S., 3,729,845.

Barmag Barmer Maschinenfabrik Aktiengesellschaf: *See—*
Mayer, Manfred; and Naydowski, Reinhard, 3,729,915.

Barmag Barmer Maschinenfabrik Aktiengesellschaft: *See—*
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Barnard, Dominic Paul Edmund, to Smiths Industries Limited. Time delay switch with improved dashpot means. 3,731,021, Cl. 200-34.000.

Barnes, Jeffery W.: *See—*
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Barnes, Robert L.; Block, William M.; and Grafstein, Daniel, to Singer Company, The, mesne. Polyurethane copolymers derived from the carborane-silicon phthalocyanine monomer. 3,730,950, Cl. 260-77.5aq.

Barnhard, Philip, IV. Seismographic device. 3,730,289, Cl. 181-.5nc.

Barnstead, John W.; and Wiseman, Everett D., to Vernco Corporation. Cooling means for motor of a wet pick-up vacuum sweeper. 3,730,642, Cl. 417-424.000.

Barrera, Roberto Gonzalez: *See—*
Rubio, Manuel Jesus, 3,730,732.

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Moore, Christopher John; and Barry, Brian, 3,730,639.

Bartholomew, Ray E.: *See—*
Herpich, William A.; Palmer, George W.; and Bartholomew, Ray E., 3,730,365.

Baruzzini, Gino L., to Pet Incorporated. Modular insulated panel system. 3,729,889, Cl. 52-264.000.

BASF Wyandotte Corporation: *See—*
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Basic Ceramics Incorporated: *See—*
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Bathory, Bela Istvan, to Davy and United Engineering Company, Limited. Devices for applying forces. 3,730,036, Cl. 83-554.000.

Batson, William A., to Singer Company, The. Sabre saws with lockable swivel saw bars. 3,729,822, Cl. 30-394.000.

Battelle Memorial Institute: *See—*
Tannenberger, Helmut; and Charbonnier, Jean-Claude, 3,730,771.

Bauer, Kurt: *See—*
Edele, Reinhard; Kohler, Alfred; and Bauer, Kurt, 3,729,767.

Baues, Dietrich; Marini, Richard; and McCauley, Donald, to G.A.C. International Inc. Orthodontic arch wire. 3,729,824, Cl. 32-14.00a.

Bauknecht, Otto; and Horl, Adolf, to Zahnradfabrik Friedrichshafen AG. Apparatus and method of finishing gear teeth. 3,729,967, Cl. 72-102.000.

Baumann, Hans D., to Mosoneidan International, Inc. Adjustable fluid restrictor. 3,730,479, Cl. 251-121.000.

Baumer, Wilhelm: *See—*
Schmitt, Dieter; Stein, Alfred; and Baumer, Wilhelm, 3,730,688.

Baumgarten, Donald J.: *See—*
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Baxter Laboratories, Inc.: *See—*
Hoeltzenbein, Josef, 3,730,350.
Wood, Joseph T., 3,730,376.

Bay Mechanical Company: *See—*
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Beale, Julian Robert Anthony; and Kerr, John Anthony, to U.S. Philips corporation. Methods of manufacturing a semiconductor device. 3,729,811, Cl. 29-578.000.

Beall, Richard W., Jr.: *See—*
Doornbos, William A., 3,730,191.

Bean, Frederic Roland: *See—*
Olivares, Ismael Adolfo; Bean, Frederic Roland; and Haist, Grant Milford, 3,730,727.

Beaty, Thomas, Jr.; and Samander, Asib S. Automatic stacking apparatus. 3,730,357, Cl. 214-6.0dk.

Beaunit Corporation: *See—*
Lusk, Harold B.; Cooke, Herbert E.; and Pryor, Leon D., 3,729,916.

Bebinger, Jack E., to Westinghouse Electric Corporation. Self-aligning bearing with multiple assembly sequence. 3,730,598, Cl. 308-132.000.

Becht, Carl T., to Senco Products, Inc. Fastener applying device. 3,730,414, Cl. 227-130.000.

Beck, Norman A., to Koppers Company, Inc. Selective drum printer with pawl means to lock the type wheel in selected position. 3,730,085, Cl. 101-110.000.

Becker, Edward A., to Intertherm, Inc. Supplemental heater unit for air conditioner of the dual blower type. 3,731,056, Cl. 219-361.000.

Becker, Robert N.: *See—*
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Beckius, Herbert J. P.: *See—*
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Beech, Sydney George, to Mansfield Heat Limited. Electric cooking ovens. 3,731,039, Cl. 219-407.000.

Beermann, Claus: *See—*
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Beharrell, George David; and Adams, George Edward. Rim for mounting pneumatic tires on wheels. 3,730,248, Cl. 152-379.000.

Behm, John W.: *See—*
United States of America, National Aeronautics and Space Administration, 3,729,935.

Belde, Horst; and Daubach, Ewald, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Pigment formulations. 3,730,747, Cl. 106-288.00b.

Beliveau, Roger Louis: *See—*
Sloane, Ivan Henry; Mailhot, Armand Ludovic; Beliveau, Roger Louis; and Sawhney, Harbans Lal, 3,729,917.

Belkin, Nathan L. Hospital garment. 3,729,747, Cl. 2-114.000.

Belknap, Donald J., 50% to Shapiro, Nelson H. and 50% to Field, Milton M. Miniature incandescent lamp and apparatus and method for making the same. 3,729,783, Cl. 29-25.130.

Bell & Howell: *See—*
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Bell & Howell Company: *See—*
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Neff, Joseph J., 3,730,613.
Woodier, James G., 3,730,615.

Bell, C. Gordon. Homogeneous memory for digital computer systems. 3,731,285, Cl. 340-172.500.

Bell Telephone Laboratories, Incoporated: *See—*
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Bellanca, Joseph V., to McCain Manufacturing Corporation. Method and apparatus for making books. 3,730,512, Cl. 11-1.000.

Bellinger, Horst: *See—*
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Bendix Corporation, The: *See—*
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Bennett, James G.; and Katchman, Arthur, to General Electric Company. Process for the preparation of polyphenylene ethers with promoted copper-amine catalysts. 3,730,944, Cl. 260-47.0et.

Bennetto, Harold H. Rotary engine. 3,730,145, Cl. 123-8.410.

Benzon, Robert O.; and Dybdal, Richard K. Screw conveyor coupling. 3,730,332, Cl. 198-213.000.

Berends, Howard P., to Holland Hitch Company. Container lift. 3,730,366, Cl. 214-512.000.

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Berger, Abe: *See—*
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Berger, Isaac, to Carrier Corporation. Air conditioning unit having means for providing filtered make-up air. 3,729,951, Cl. 62-427.000.

Bergkamp, Helen Gerber: *See—*
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Bergkamp, Robert L.; and Bergkamp, Helen Gerber. Folding bracket mechanism. 3,730,107, Cl. 108-39.000.

Berkey Photo, Inc.: *See—*
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Berkhout, Augustinus J.: *See—*
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Berkman, Richard M.: *See—*
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Berland, Jean-Rene: *See—*
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Berler, Robert M.; Alpert, Norman; and Murthy, Nanjudiah N., to Pitney Bowes-Alpex, Inc. Data processing system and reader therefor. 3,731,064, Cl. 235-61.11e.

Berlincourt, Don A.; and Schweitzer, Earl O., to Vernitron Corporation. Multi-burner gas stove with piezoelectric ignition. 3,730,672, Cl. 431-264.000.

Berry, David A.: *See—*
Cremeans, George E.; Berry, David A.; Rosenberg, Harvey S.; Genco, Joseph M.; and Morrison, David L., 3,730,833.

Bers, Abraham, to Massachusetts Institute of Technology. Generation of weakly damped electron plasma surface waves on a semiconductor; amplification and coupling of acoustic waves on an adjacent piezoelectric. 3,731,214, Cl. 330-5.500.

Berthon, Robert: *See—*
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Besenfelder, Edward R., to Honeywell Information Systems, Inc. Phase-locked oscillator for use with variable speed data source. 3,731,220, Cl. 331-1.00a.

Bethlehem Steel Corporation: *See—*
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Bettiga, Albert C.; and Chang, Leo S., to International Business Machines Corporation. Toner distribution process. 3,731,146, Cl. 317-3.000.

Beurrier, Henry Richard, to Bell Telephone Laboratories, Incorporated. Broadband transformers. 3,731,237, Cl. 333-24.00r.

Bhatia, Mahesh, to Anchor Plastics Company, Inc. Cutting tubular plastic extrusion. 3,730,035, Cl. 83-54.000.

Bickl, Horst; and Pfeifer, Josef, to Agfa-Gevaert Aktiengesellschaft. Method and arrangement for positioning of a selected image in a sequence of images at a predetermined location. 3,731,063, Cl. 235-61.11e.

Billock, Paul J.: *See—*
Arnett, Lawrence E.; and Billock, Paul J., 3,730,216.

Bilow, Norman; and Jones, John R., to Hughes Aircraft Company. Solid lubricants and methods. 3,730,893, Cl. 252-12.400.

Binard, William J.; and Dye, John F., to Kendall Company, The. Vent for liquid drainage system. 3,730,209, Cl. 137-217.000.

Binary Systems, Inc.: *See—*
Reilly, John J., Jr., 3,731,062.

Binder, Georg: *See—*
Hagenlocher, Walter; and Binder, Georg, 3,731,126.

Bio-Science Laboratories: *See—*
Demetroiu, James A., 3,730,684.

Biospherics Incorporated: *See—*
Levin, Gilbert V.; and Topol, George J., 3,730,882.

Bird, George R.; and Rosenoff, Alan E., to Polaroid Corporation. Photoresponsive articles comprising multilayer spectral sensitization systems. 3,730,714, Cl. 96-1.700.

Bishop, Arthur E.: *See—*
Bishop, Arthur E.; and Henrich, Richard E., 3,730,018.

Bishop, Arthur E.; and Henrich, Richard E., to Bishop, Arthur E. Torque-balanced steering system. 3,730,018, Cl. 74-498.000.

Bishop, Harold A.: *See—*
Deane, William Ronald, 3,730,161.

Bissett, James S., to Gulf Oil Corporation. Temperature responsive safety valve stems. 3,730,204, Cl. 137-68.000.

Bixler, Henry A.: *See—*
Spencer, Donald J.; Durran, Donald A.; and Bixler, Henry A., 3,731,221.

Blachut, Theodore J.; Paulun, Manfred; Ferry, Kirk; and Amaro, Angel Garcia, to Canadian Patents and Development Limited. Stereocomplier. 3,729,830, Cl. 33-20.00d.

Black and Decker Manufacturing Company: *See—*
Wood, John W., 3,730,281.

Black and Decker Manufacturing Company, The: *See—*
Weber, Edwin J., 3,729,912.

Blackwell Electronics Ind. Co., Ltd.: *See—*
Hirono, Akira; and Miyajima, Masayoshi, 3,731,182.

Bladzik, Kenneth R.: *See—*
Mollica, Richard J., Jr.; Hunter, Joseph E., Jr.; and Bladzik, Kenneth R., 3,729,805.

Blake, Roy B., Jr., to United States of America, Navy. Time mark-numeral generator system. 3,731,262, Cl. 340-2.000.

Blasbalg, Herman L., to International Business Machines Corporation. Synchronization device for anti-jamming communications system. 3,731,198, Cl. 325-42.000.

Blaylock, Arnold O., to Lectric Lites Company. Emergency warning light apparatus. 3,731,082, Cl. 240-10.500.

Bleil, Carl E.: *See—*
Albers, Walter A., Jr.; Bleil, Carl E.; and Swets, Don E., 3,730,867.

Bleil, Carl E., to General Motors Corporation. Semiconductive chip attachment means. 3,729,818, Cl. 29-630.000.

Bleiweiss, Eugene, to Metaframe Corporation. Aquarium heater. 3,731,058, Cl. 219-523.000.

Block, Forest E.; and Peterson, Kenneth E. Precision boring machine. 3,730,029, Cl. 82-12.000.

Block, William M.: *See—*
Barnes, Robert L.; Block, William M.; and Grafstein, Daniel, 3,730,950.

Blood, Raymond; Strong, Colin Barry; and Pearson, Alan John, to William Cotton Limited. Straight bar knitting machines. 3,729,955, Cl. 66-89.000.

Bloom, Stanley M.: *See—*
Land, Edwin H.; Bloom, Stanley M.; and Farney, Leonard C., 3,730,716.

Bloxham, Samuel Dawson; and Haigh, Robert Laird. Exercising apparatus for small children. 3,730,587, Cl. 297-274.000.

Boaz, Donald P. Silicate polymer vehicles for use in protective coatings and process of making. 3,730,746, Cl. 106-287.0se.

Bobb, Paul D., to Armstrong Cork Company. Chair pack. 3,729,893, Cl. 53-27.000.

Bode, Charles H., Jr., to United States Steel Corporation. Apparatus for supporting and operating a slidable gate and extended tube nozzle on a bottom-pour vessel. 3,730,401, Cl. 222-512.000.

Bodenseewerk Perkin-Elmer & Co., GmbH: *See—*
Witte, Wolfgang, 3,730,630.

Bodycomb, Alistair K., to Domtar Limited. Air bearing anvil. 3,730,061, Cl. 93-59.0mt.

Boeing Company, The: *See—*
Sikorra, Charles F., 3,729,985.

Boffe, Maurice, to Glaverbel S.A. Apparatus for modifying a property of an article by diffusion. 3,730,871, Cl. 204-245.000.

Boggs, Pamela P.: *See—*

Buckman, John D.; Raths, Fred W.; Boggs, Pamela P.; and Donerson, Robert L., 3,730,888.

Boggs, Wilburn A.; and Miller, Robert N., to Lockheed Aircraft Corporation. Elastomeric corrosion-inhibiting coating and sealing material. 3,730,937, Cl. 260-37.00r.

Boghosian, Malcolm P., to Allergan Pharmaceuticals. Method of delivery of solution to skin having substantial amounts of hair thereon. 3,730,182, Cl. 128-173.000.

Bolkow Gesellschaft mit beschrankter Haftung: *See*—
Schmidt, Gunther; Theiss, Armin; Dederra, Carl-Helmut; and Kaiser, Leonnard, 3,729,793.

Bollig, Georg; Zeller, Josef; and Simons, Willi, to Schloemann Aktiengesellschaft. Continuous casting machine. 3,730,255, Cl. 164-274.000.

Bolton, Percy J.: *See*—
Marston, James W.; and Bolton, Percy J., 3,729,813.

Bonnamy, Philippe J. F., to Compagnie Francaise des Petroles. Method of making electrical connectors and connectors therefor. 3,731,250, Cl. 339-12.00v.

Boor, John, Jr., to Shell Oil Company. Cyclic ether polymerization process. 3,730,922, Cl. 260-2.00a.

Boothroyd, Wilson P.: *See*—
Whitman, Garo Arevian; Boothroyd, Wilson P.; and Dunbar, Elton E., 3,731,067.

Borden, Inc.: *See*—
Stehle, Peter Fallon; Dickstein, Jack; and Loshaek, Samuel, 3,730,933.

Borg-Warner Corporation: *See*—
Bush, John W.; and Cunningham, Andrew E., 3,730,541.
Mead, Robert H.; and Zimmer, George A., 3,730,009.
Miller, Robert C., 3,730,176.
Zimmer, George A., 3,730,316.

Borskey, Charles L. Storable vehicle canopy. 3,730,196, Cl. 135-5.00a.

Bos, John R.; Sorensen, Clarence A.; and Van Elzelingen, Laurens, to Gardner-Denver Company. Reciprocation drive and counterweight arrangement for power saws. 3,729,823, Cl. 30-394.000.

Bos, Marinus A.: *See*—
Schmidt, William G.; Gabbard, Ova G.; Husted, John M.; Maillet, Wilfrid G.; and Bos, Marinus A., 3,730,998.

Bosch, Robert, Fernsehanlagen GmbH: *See*—
Radecke, Helmut, 3,730,987.

Bosch, Robert, G.m.b.H.: *See*—
Burgholte, Alwin; Wirtz, Rainer; and Domann, Helmut, 3,731,169.
Hagenlocher, Walter; and Binder, Georg, 3,731,126.
Knapp, Heinrich, 3,730,155.
Siegel, Heinz; and Kraisel, August, 3,730,058.
Wessel, Wolf, 3,731,195.

Boschen, John A.; and Francis, Reid E., to Ford Motor Company. Vehicle window system. 3,729,867, Cl. 49-98.000.

Bosisio, Renato G., to Canadian Patents and Development Limited. Zero-mode microwave applicator. 3,731,038, Cl. 219-10.550.

Bossons, Walter Howard; Parer, David George; and Burcher, George Davey. Article presenting apparatus. 3,730,356, Cl. 214-1.0bc.

Bostrom, Sten-Lennart, to Dasy Inter S.A. Credit card or the like. 3,731,085, Cl. 235-61.11d.

Botterman, David L.; and Lewis, Philip W., to Container Corporation of America. Carry-out tray. 3,730,419, Cl. 229-28.000.

Bouchard, Richard J.; and Sanders, William R., to Sanders Associates, Inc. Graphical keyboard operated display device. 3,731,299, Cl. 340-324.00a.

Boulaine, Paul: *See*—
Hastings, James T.; and Boulaine, Paul, 3,729,754.

Bourdier, Jean-Claude. Installation for trying on wearing apparatus. 3,729,839, Cl. 35-58.000.

Bourns, Inc.: *See*—
De Rouen, Joseph R.; Baldwin, Kenneth B.; and Martin, Henry F., 3,729,817.

Bowen, Braxton C.; and Weir, Jackie A., to Du Pont de Nemours, E. I., and Company. Process for extracting solvent from polyamide filaments. 3,730,680, Cl. 8-151.200.

Bowers, William H., to Delbar Products, Inc. Mirror positioning device. 3,730,474, Cl. 248-478.000.

Bowles, Arnold Gordon, to National Forge Company. Threaded closure high production isostatic molding device. 3,730,666, Cl. 425-405.00h.

Bowser, John O.; and Moga, Nicholas I., to Aluminum Company of America. Slat floor assembly. 3,730,140, Cl. 119-28.000.

Boydell, Kenneth Raymond, to Dowty Technical Developments Limited. Selector valves. 3,730,220, Cl. 137-596.200.

Bozik, John E.; Ondrey, John A.; and Swift, Harold E., to Gulf Research & Development Company. Process for coupling lower olefins. 3,730,957, Cl. 260-673.000.

Bracey, Kenneth Edward George: *See*—
Petrie, James Alexander; and Bracey, Kenneth Edward George, 3,729,957.

Bradshaw, Thomas I., to Minnesota Mining and Manufacturing Company. Insect trap. 3,729,858, Cl. 43-114.000.

Brady, John F., to Universal Technology, Inc. Keyboard switch and unitized multiple switch configuration. 3,731,014, Cl. 200-5.00a.

Brady, John F., to Universal Technology Inc. Control keyboard switch with cantilevered contact and diode matrix array. 3,731,015, Cl. 200-5.00a.

Braley, Silas A.: *See*—
Edmunds, Louis Henry, Jr.; and Braley, Silas A., 3,730,186.

Brandle, Karl: *See*—
Lailach, Gunter; Gerlach, Gottfried; Trenczek, Gerhard; and Brandle, Karl, 3,730,748.

Brandt, Otto; and Tocquet, Bernard. Electro-acoustic transducer. 3,731,267, Cl. 340-10.000.

Braude, Geroge L., to Grace, W. R., & Co. Polyenes modified with polyfunctional N-halo amines. 3,730,951, Cl. 260-77.50b.

Braukmann Armaturen AG: *See*—
Braukmann, Heinz-Werner, 3,730,426.

Braukmann, Heinz-Werner, to Braukmann Armaturen AG. Thermostatic valve. 3,730,426, Cl. 236-44.00c.

Braun Aktiengesellschaft: *See*—
Voigt, Gunter; and Metzler, Norbert, 3,729,821.

Braun, Francois Marie Joseph, to Societe anonyme belge d'Exploitation de la Navigation aerienne, (Sabena). Seat, couch or bed, provided with at least one vacuum cushion. 3,730,588, Cl. 297-284.000.

Braunberger, Benjamin A.: *See*—
Burrough, Donald E.; and Braunberger, Benjamin A., 3,729,907.

Brayton, Donald B., to United States of America, Air Force. Laser velocimeter employing reference beam detection. 3,730,625, Cl. 356-28.000.

Breitenbach, Lawrence P.; and Shelef, Mordecai, to Ford Motor Company. Quantitative measurement of selected nitrogen compounds in gaseous mixtures. 3,730,686, Cl. 23-232.00r.

Brems, John Henry. Rotary indexing mechanism. 3,730,014, Cl. 74-394.000.

Brems, John Henry. Electrode rod holder for resistance welding actuators. 3,731,046, Cl. 219-78.000.

Brenner & Bender Inc.: *See*—
Bender, Louis, 3,730,388.

Breza, Michael Joseph, to Cities Service Company. Bloom inhibited flame retardant compositions. 3,730,929, Cl. 260-23.00h.

Bricker, Carl E.; and Hillegass, Kenneth P., to Goodyear Tire & Rubber Company, The. Parking brake, spring applied, hydraulic released. 3,730,303, Cl. 188-170.000.

Bridgestone Tire Company Limited: *See*—
Kusunoki, Sigeru; Murakami, Yoshitsugu; Tashiro, Yutaka; and Tabata, Kazuki, 3,730,245.

Brigiliano, Florent; Vogt, Ernest; and Marmoud, Edmond, to Fabrique de Boites de Montres F. Kuhn SA. Wrist watch with dial illumination. 3,729,923, Cl. 58-50.00r.

Brincks, Richard Joseph, to American Can Company. Pull tab end for can. 3,730,377, Cl. 220-27.000.

Brinkley, Max D.; and Kerr, Glenn D., to Goodyear Tire & Rubber Company, The. Locking device for the clamps of a tube splicer. 3,730,510, Cl. 269-25.000.

British Aircraft Corporation Limited: *See*—
Everest, Frank G.; and Veasey, Thomas P., 3,731,117.

British Steel Corporation: *See*—
Bryce, Laurence Miller, 3,730,961.

Britton, Wright, to Britton Yacht Systems, Inc. Method of adapting roller wings to other sailing configurations. 3,730,124, Cl. 114-106.000.

Britton Yacht Systems, Inc.: *See*—
Britton, Wright, 3,730,124.

Brochstein, I. H. Drumstick. 3,730,570, Cl. 287-53.00r.

Brockmuller, Friedrich Franz, to Windmoller & Holscher. Severing apparatus for severing lengths of tube from a continuously fed flattened tubular web. 3,730,411, Cl. 225-100.000.

Bronne, William B.; and Linthicum, Harley E., to Carrier Corporation. Method for tube removal. 3,729,806, Cl. 29-427.000.

Bronstein, Benjamin. Folding boot-drying rack. 3,730,354, Cl. 211-38.000.

Brooks, Robert N.: *See*—
Hutchinson, Bruce R.; Hunter, Bruce H.; and Brooks, Robert N., 3,730,112.

Brother Kogyo Kabushiki Kaisha: *See*—
Watanabe, Tomoyoshi, 3,730,323.

Brown & Root, Inc.: *See*—
Koehler, Albert M., 3,729,940.
Rochelle, William R., 3,729,941.
Ward, Delbert R.; and Rochelle, William R., 3,730,537.

Brown, Blanchard W.: *See*—
Brubaker, Robert D.; and Brown, Blanchard W., 3,730,682.

Brown, Carlton E.; and Armstrong, Raymond I., to Lear Siegler, Inc. Control and indicator mechanism. 3,730,132, Cl. 116-133.000.

Brown, Larry P., to Cities Service Oil Company. Method of offset explosive stimulation. 3,730,274, Cl. 166-299.000.

Brown, Morris E., to Eastman Kodak Company. Stripper mechanism. 3,730,454, Cl. 242-192.000.

Brown, Omar L., to Fraze, Ermal C. Easy opening can end with non-removable tab. 3,730,379, Cl. 220-48.000.

Brown, Peter W., to Outboard Marine Corporation. Drain return for engine. 3,730,149, Cl. 123-73.00r.

Brubaker, Robert D.; and Brown, Blanchard W., to Staphex Corporation. Sterilization system for clothes treating machines and method of using. 3,730,682, Cl. 21-58.000.

Bruckner-Apparatebau Michelstadt GmbH: *See*—
Schuierer, Manfred, 3,730,679.

Bruder, Werner; and Grieb, Hubert, to Daimler-Benz Aktiengesellschaft. Shift element for gas turbine for shifting between series and parallel operations. 3,730,649, Cl. 417-408.000.

Brugler, Joseph S., to United States of America, Navy. Target center television tracking system. 3,730,277, Cl. 178-6.800.

Brumm, Richard S., to Walworth Company. Rotary valve pressure regulating system. 3,730,214, Cl. 137-487.000.

Brummer, Samuel B.: *See—*
Makrides, Alkis C.; and Brummer, Samuel B., 3,730,885.

Brunswick Corporation: *See—*
Richardson, Robert, 3,730,241.
Roberts, John A.; Roberts, Peter R.; and Danzey, Lee B., 3,730,227.

Bryant, Herbert William, to Bell Telephone Laboratories, Incorporated. Electroacoustic transducer having improved transducing element supporting means. 3,731,124, Cl. 310-9.400.

Bryce, Laurence Miller, to British Steel Corporation. Arc ignition by seeded gas. 3,730,961, Cl. 13-9.000.

Bryner, Renald F., Jr.: *See—*
Lange, Eugene A.; and Bryner, Renald F., Jr., 3,729,829.

BTM Corporation: *See—*
Sawdon, Edwin G., 3,730,044.

Buchanan, Harry Charles, Jr., to General Motors Corporation. Windshield wiping apparatus. 3,729,766, Cl. 15-250.210.

Buchwald, Robert M., to General Motors Corporation. Engine accessory arrangement. 3,730,147, Cl. 123-41.440.

Buckman, John D.; Raths, Fred W.; Boggs, Pamela P.; and Donerson, Robert L., to Buckman Laboratories, Inc. Method of flocculating with tertiary aminohydroxyalkyl esters of carboxylic acid polymers. 3,730,888, Cl. 210-52.000.

Buckman Laboratories, Inc.: *See—*
Buckman, John D.; Raths, Fred W.; Boggs, Pamela P.; and Donerson, Robert L., 3,730,888.

Budd Company, The: *See—*
Buyze, Edwin K., 3,730,304.
Eggert, Walter S., Jr., 3,730,586.

Buddecke, Charles L.; and LeValley, John, to Accumed, Inc., mesne. Sphygmomanometer. 3,730,172, Cl. 128-2.05m.

Budris, Allan R.; and Tokarczyk, Tadeusz A., to Worthington Corporation. Floating debris recovery basket. 3,730,119, Cl. 114-.50r.

Buescher, William E.; and Kerstetter, Donald R., to GTE Sylvania Incorporated. Strengthened cathode material and method of making. 3,730,706, Cl. 75-206.000.

Buettner, Egon: *See—*
Oppenlaender, Knut; Liebold, Gert; and Buettner, Egon, 3,730,906.

Bugaut, Andree: *See—*
Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, 3,730,677.

Bugmann, Ernst, to Unilan A.G. Glass-fiber reinforced polyurethane elastomers. 3,730,936, Cl. 260-37.00n.

Buhrer, Erwin: *See—*
Buhrer, Erwin; and Keller, Franz (said Keller assor. to said), 3,730,253.

Buhrer, Erwin; and Keller, Franz, said Keller assor. to said Buhrer, Erwin. Pattern device for foundry molds. 3,730,253, Cl. 164-241.000.

Bullard, Robert L.; and Wheeler, Donald C., to International Business Machines Corporation. Micro-miniature probe assembly. 3,731,191, Cl. 324-158.00f.

Bunker Ramo Corporation: *See—*
Occhipinti, Carl, 3,731,259.

Bunker, Richard D., to Dyna-Flex Corporation. Single exposed plastic relief image printing plate washer. 3,730,069, Cl. 95-98.000.

Bunnelle, Philip R.: *See—*
Wenneborg, William Z.; Bunnelle, Philip R.; and Payne, Bobby R., 3,730,592.

Burcher, George Davey: *See—*
Bossons, Walter Howard; Parer, David George; and Burcher, George Davey, 3,730,356.

Burgess Micro Switch Company Limited: *See—*
McAlpine, Ernest, 3,731,031.

Burgholte, Alwin; Wirtz, Rainer; and Domann, Helmut, to Bosch, Robert, G.m.b.H. Digital slip frequency control circuit for asynchronous dynamo electric machines. 3,731,169, Cl. 318-227.000.

Burke, Donald J.; and Cole, Judson C., to Continental Industries, Inc. Tool for squeezing off flexible pipe. 3,730,478, Cl. 251-8.000.

Burkett, Francis L., to Dow Chemical Company, The. Egg carton. 3,730,420, Cl. 229-44.00r.

Burkhardt, Gisbert, to Telefunken Patentverwertungsgesellschaft m.b.H. Apparatus for the separate discharge of flat items from a stack. 3,730,514, Cl. 271-11.000.

Burlington Industries, Inc.: *See—*
Wedler, Frederick C.; and Wang, Kenneth Y., 3,730,678.

Burns, Bland Calvin; and Albertsen, Hans C. Method and apparatus for conveying sewage. 3,730,884, Cl. 210-15.000.

Burns, John Andrew, to Western Electric Company, Incorporated. Method of forming a circuit. 3,729,816, Cl. 29-593.000.

Burns, Thomas A.: *See—*
Meyer, Bennett A.; Burns, Thomas A.; and Anelli, Peter, 3,731,309.

Burnside, Floyd D., to Shell Oil Company. Apparatus and method for filtering well fluids. 3,730,268, Cl. 166-177.000.

Burrough, Donald E.; and Braunberger, Benjamin A., to Gehl Company. Mower conditioner. 3,729,907, Cl. 56-14.100.

Burroughs Corporation: *See—*
Caras, Bernard, 3,730,511.
Hennessey, William M., 3,730,972.
Kupsky, George A., 3,731,131.
Walsh, Robert J., 3,731,291.

Burshtein, Mikhail Vladimirovich: *See—*
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Tkach, Khaim Berkovich; Nazarov, Nikolai Grigorievich; Malbert, Petr Eduardovich; Lavron, Nikolai Sergeevich; Alkasarov, Jury Innokentievich; Legeche, Nikolai Leontievich; Golbinshtein, Alexanr Isovich; Reinsburg, Alexandr Mironovich; Burshtein, Mikhail Vladimirovich; Mikushin, Dmitry Pavlovich; Terskov, Alexei Danilovich; and Belov, Leonid Stepanovich, 3,730,283.

Burton, Jean A.; White, T. Stanley; and Myrland, Harold M., to Hormel, Geo. A., & Co. Process and apparatus for slicing and weighing bacon for packaging. 3,730,742, Cl. 99-233.110.

Burum, Harold J. Frame connecting piece. 3,729,868, Cl. 49-420.000.

Burwell, Rodney P., to Northwestern National Bank of Minneapolis. Barge cover. 3,730,128, Cl. 114-201.000.

Bush, John W.; and Cunningham, Andrew E., to Borg-Warner Corporation. Fluid pressure brake system. 3,730,541, Cl. 303-21.00f.

Buske, Erwin. Claw hook for chains. 3,729,926, Cl. 59-93.000.

Buss, Benjamin Alvin; and Buss, Donald C. Cassette and intimate system of washing soiled fabrics and material. 3,729,959, Cl. 68-19.100.

Buss, Donald C.: *See—*
Buss, Benjamin Alvin; and Buss, Donald C., 3,729,959.

Butler, Richard G. Friction type screwdriver. 3,730,238, Cl. 145-76.000.

Buttle, Robert Leroy; and Bailey, William Douglas, to RCA Corporation. Electronic device package. 3,730,969, Cl. 174-52.00s.

Buyze, Edwin K., to Budd Company, The. Fabricated ring for a brake disk. 3,730,304, Cl. 188-218.0xl.

Buzga, Heinrich: *See—*
Pause, Kurt; and Buzga, Heinrich, 3,730,343.

Byron, Donald John: *See—*
Shilton, Brian Roger; and Byron, Donald John, 3,729,931.

Cahill, Lysle D.; and Denlinger, George William, to Mead Corporation, The. Precision drive for printing cylinder. 3,730,011, Cl. 74-221.000.

California R&D Center: *See—*
Smith, Jay, III; Schmidt, Gerald W.; and Jones, Lawrence T., 3,729,859.

Camp, John W. A., to Ford Motors Company. Device for connecting a cable to a lever. 3,730,318, Cl. 192-99.00s.

Campbell, Colin: *See—*
McDermott, Peter; and Campbell, Colin, 3,730,413.

Campbell, Jesse L.; Klein, Walter F.; and Lowry, Denis E., to International Business Machines Corporation. Cartridge particularly suitable for disc record member. 3,730,602, Cl. 312-10.000.

Campbell, Leslie T.; and Vetter, Joseph J., to United States of America, Navy. Apparatus for determining the position of a surface vessel with respect to a signal source. 3,731,264, Cl. 340-3.0ps.

Canadian Industries Limited: *See—*
Falconer, Errol Linton; and Finch, Gerhard Franz Otto Karl, 3,730,790.

Canadian Patents and Development Limited: *See—*
Blachut, Theodore J.; Paulun, Manfred; Ferry, Kirk; and Amaro, Angel Garcia, 3,729,830.
Bosisio, Renato G., 3,731,038.

Canam Manufacturing & Packaging Limited: *See—*
Hastings, James T.; and Boulaine, Paul, 3,729,754.

Cannon, Peter: *See—*
Richards, Reynald B.; O'Brien, William P.; and Cannon, Peter, 3,730,796.

Capitol Hardware Manufacturing Company, Inc.: *See—*
Wavrunek, John R., 3,730,477.

Capron, John W.: *See—*
Trant, Robert F.; Gray, Kenneth W.; and Capron, John W., 3,730,087.

Caras, Bernard, to Burroughs Corporation. Clamp for use in assembling display device. 3,730,511, Cl. 269-152.000.

Carle, Giovanni. Machine for transferring molded chocolate products from their shaping molds to packing boxes. 3,729,888, Cl. 53-251.000.

Carleson, Bengt Goran Fredrik: *See—*
Ahrland, Sten Harald; Carleson, Bengt Goran Fredrik; and Lindhe, Jarl Soren, 3,730,886.

Carlson, Lewis R.; Hervig, Eugene E.; and Oehlers, Kenneth J. Digital computer incorporating base relative addressing of instructions. 3,731,283, Cl. 340-172.500.

Carrier Corporation: *See—*
Berger, Isaac, 3,729,951.
Bronne, William B.; and Linthicum, Harley E., 3,729,806.
Gutheim, August W.; and Herb, Carl C., 3,730,071.
Macleod, David E., 3,729,952.

Carter, Forrest L. High resolution, high etendue, retarding-potential electron concentrator. 3,731,096, Cl. 250-49.5ae.

Casavant, Albert R. Cymbal holder. 3,730,047, Cl. 84-402.000.

Casper, Clarence, Jr.: *See—*
Saunders, John; and Casper, Clarence, Jr., 3,731,218.

Caspers, James W.; and Nuese, Carlos, to United States of America, Navy. Track-before-detect system. 3,731,304, Cl. 343-5.0dp.

Cassel, Thomas R. Exhaust pipe with combined bendable partition. 3,730,293, Cl. 181-36.00b.

Castegnier, Adrien. Electrolytic light modulation systems. 3,730,608, Cl. 350-160.00r.

Caterpillar Tractor Co.: *See—*

Herr, Charles H.; and McIntosh, Alexander C., 3,730,314.
Caule, Elmer J.; Sperry, Philip R.; Pryor, Michael J.; and Ford, James. Oxidation resistant iron base alloy. 3,730,779, Cl. 148-6.350.
Cecil, James B.; and Howard, William G., Jr., to Motorola, Inc. Reference current source. 3,731,181, Cl. 323-4.000.
Celanese Corporation: *See—*
Trapasso, Louis E.; and Stackman, Robert W., 3,730,681.
Watson, George A., 3,730,824.
Celebi, Gurbuz Ali: *See—*
Harvey, Robert J.; and Celebi, Gurbuz Ali, 3,730,737.
Cellini, Vito. Tool holder locking device for rotating spindles. 3,730,637, Cl. 408-239.000.
Central Transformer, Inc.: *See—*
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Cerny, Frank J. Jr., to Motorola, Inc. Broadband circuit for minimizing the effects of crystal shunt capacitance. 3,731,230, Cl. 331-116.00r.
Certain-Teed Saint Gobain Insulation Corporation: *See—*
Swander, Kenneth D., Jr., 3,730,056.
Chadwick, Charlie F. Convertible trailer. 3,730,542, Cl. 280-9.000.
Chadwick, Ray F.; and Robertson, John H., to Bendix Corporation, The. Energy absorber for high pressure fluid jets. 3,730,040, Cl. 83-177.000.
Champion International Corporation: *See—*
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Chandler, James Parker: *See—*
Mueller, Fritz Kurt; Martin, Billy Otis; Chandler, James Parker; and Martin, Robert Cherry, 3,729,998.
Chandos, Laurence R., to Frank, G. B., Incorporated. Inflatable display banner. 3,729,847, Cl. 40-125.00f.
Chang, Leo S.: *See—*
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Chao, Junn-Ling; Wicks, Moye, III; and Pounds, Thomas W., to Shell Oil Company. Method and apparatus for measuring slurry concentration and velocity distribution in a slurry pipeline. 3,729,987, Cl. 73-61.00r.
Chapman, Ronald W., to Shell Oil Company. Mechanically oriented perforating system. 3,730,282, Cl. 175-4.510.
Charbonnier, Jean-Claude: *See—*
Tannenberger, Helmut; and Charbonnier, Jean-Claude, 3,730,771.
Charlot, Lincoln H., Jr., to Minnesota Mining and Manufacturing Company. Electrical detecting means. 3,731,307, Cl. 343-7.5.
Charters, Thomas H. Pulse generator. 3,731,111, Cl. 307-106.000.
Cheek, Forrest R.: *See—*
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Cheney, Glen Trenton, to Bell Telephone Laboratories, Incorporated. Combined bipolar and field effect transistors. 3,731,164, Cl. 317-235.00r.
Chesky, Sheldon R., to Kendall Company, The. Sterile shielded container. 3,730,338, Cl. 206-63.20r.
Chevallier, Pierre, to Etablissements Genoud & Cie. Cigarette-lighter flint wheel action. 3,730,671, Cl. 431-274.000.
Chevron Research Company: *See—*
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Chibata, Ichiro; Kakimoto, Toshio; Shibatani, Takeji; and Nishimura, Noriyuki, to Tanabe Seiyaku Co., Ltd. Enzymatic preparation of L-citrulline. 3,730,838, Cl. 195-29.000.
Chikama, Toshio, to Kabushiki Kaisha Machida Seisakusho. Endoscope providing an image of an observed object and a scale by which the true size of the object can be determined from the image. 3,730,632, Cl. 356-156.000.
Childers, Billie W.: *See—*
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Cho, Nakwon, to United States of America, Atomic Energy Commission. Continuous flow centrifuge with means for reducing pressure drop. 3,730,422, Cl. 233-16.000.
Chori Company, Ltd.: *See—*
Kawasaki, Kentaro; Ono, Takyuki; and Takizawa, Keizo, 3,729,918.
Chow, Philip Y. Apparatus and methods for preparing skewered food products. 3,729,774, Cl. 146-1.00r.
Christensen, Thorkild, to Danfoss A/S. Valve arrangement for hydraulic steering system. 3,730,207, Cl. 137-106.000.
Christian, Donald K.; and Lomax, Dennis L., to Piedmont Engineering and Machine Company, Inc. Liquid treating apparatus for textile materials and method. 3,729,958, Cl. 68-19.100.
Christman, Frank E.: *See—*
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Christman, Robert D.; Elliott, George E.; and Guelfi, Guglielmo, to Gulf Research & Development Company. Two-bed catalyst arrangement for hydrodesulfurization of crude oil. 3,730,879, Cl. 208-210.000.
Christofferson, James, to High Voltage Power Corporation. Expansion joint for gas-insulated transmission line. 3,730,965, Cl. 174-13.000.
Chrysler Corporation: *See—*
Sarto, Jorma O., 3,730,156.
Chu, Victor Fu Hua; and Cohen, Abraham Bernard, to Du Pont de Nemours, E. I., and Company. Photohardenable element with light-developable direct writing silver halide overcoating. 3,730,717, Cl. 96-27.00r.
Church, Bruce, Inc.: *See—*
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Ciba-Geigy Corporation: *See—*
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Green, Joseph; and Versnel, John, 3,730,942.
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Clark, John A., Jr., to Patterson-Kelley Co. Inc., The. Water heating system. 3,730,261, Cl. 165-39.000.
Clark, John E., to Ritt Laboratories, Inc. Secrecy communication system. 3,731,197, Cl. 325-32.000.
Clark, Russell C. Load anchoring device. 3,730,552, Cl. 280-179.00r.
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Clayton Dewandre Company Limited: *See—*
Shilton, Brian Roger; and Byron, Donald John, 3,729,931.
Clementson, John Joseph; and Johnson, Peter Graham, to Imperial Chemical Industries Limited. Halogenated hydrocarbon compositions and uses thereof. 3,730,904, Cl. 252-171.000.
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Clinton Watch Company: *See—*
Wein, Irving L., 3,729,922.
Coblentz, Robert C. Harvesting system using tree frame. 3,729,906, Cl. 56-1.000.
Cochrane, Peter Ronald, to EMI Limited. Improvements relating to release mechanism for buoys. 3,729,755, Cl. 9-8.00r.
Cockerill-Ougree-Providence et Esperance Longdoz en abrege "-Cockerill": *See—*
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Coffey, William F., to Westinghouse Electric Corporation. Snap-on terminal assembly for meter sockets. 3,731,253, Cl. 339-217.00s.
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Coley, Robert M. Wheel washing apparatus. 3,729,763, Cl. 15-21.00b.
Colgan, Francis E.; and Reeve, Paul H., to Auto Research Corporation. Liquid system function indicator. 3,730,297, Cl. 184-6.400.

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Colledge, Gary C. Rotary hot die embosser with tapered shaft and insulated embossing wheel. 3,730,081, Cl. 101-25.000.
Colley, John G.: *See—*
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Collins Radio Company: *See—*
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Scannell, Jack W., 3,730,799.
Collins, Russell William, to Bell Telephone Laboratories, Incorporated. Combined voice frequency transmission and DC signaling circuit. 3,731,234, Cl. 333-1.000.
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Colombini, Serafino. Automatic feeder, applicable to collar plasticizing machines and related functional method. 3,730,513, Cl. 271-9.000.
Colovas, Denny D.; Logan, John S.; and Skruch, Richard R., to Ford Motor Company. Passenger compartment. 3,730,583, Cl. 296-64.000.
Columbia Broadcasting System: *See—*
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Combustion Engineering Inc.: *See—*
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Jonakin, James, 3,730,499.
Combustion Unlimited, Incorporated: *See—*
Straitz, John F., III, 3,730,673.
Cominco Ltd.: *See—*
Groenveld, Pieter, 3,730,700.
Commander, Robert D.; and Dixon, Jerry D., to International Business Machines Corporation. Disc file head movement control system. 3,731,177, Cl. 318-603.000.
Commissariat a l'Energie Atomique: *See—*
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Communications Satellite Corporation: *See—*
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Compagnie Francaise des Petroles: *See—*
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Compagnie Generale d'Electricite: *See—*
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Conery, William J.; and Kaessen, Donald A., to Hydr-O-Matic Pump Company. Diaphragm controlled air relief valve. 3,730,215, Cl. 137-494.000.
Connick, Francis Glenn: *See—*
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Conoflow Corporation: *See—*
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Conrad, Joseph D., Sr.; and Roberts, Bruce W., to Westinghouse Electric Corporation. Dual strength blade of 17-4Ph stainless steel. 3,730,785, Cl. 148-142.000.
Construction Specialties, Inc.: *See—*
Helwig, Frederick Charles, 3,730,074.
Olsen, Robert W., 3,729,891.
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Continental Can Company, Inc.: *See—*
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Trant, Robert F.; Gray, Kenneth W.; and Capron, John W., 3,730,087.
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Continental Oil Company: *See—*
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Scott, William P.; and Woods, Warren W., 3,730,896.
Contratto, James, to U.S. Industries, Inc. Automatically operable end connector for a power distribution system. 3,731,255, Cl. 339-21.00r.
Controls Bailey Societe Anonyme: *See—*
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Cook, Inc.: *See—*
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Cook, Russell John; Kuehl Donald Roy; and Mueller, David Charles, to American Can Company. Package and display system therefor. 3,730,738, Cl. 99-174.000.
Cook, Sidney D.; and Watkins, Louie W., Jr., to Data Packaging Corporation. Flotation assembly. 3,729,756, Cl. 9-8.00r.
Cook, William A.; and Lerwick, Everett R., to Cook, Inc. Endarterectomy apparatus. 3,730,185, Cl. 128-303.000.
Cook, William K.; and Turley, Barry J., to General Electric Company. Commutator air deflector. 3,731,121, Cl. 310-227.000.
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Coquet, Jean Louis: *See—*
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Corcoran, Edward J. Safety closure. 3,730,371, Cl. 215-9.000.
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Cordiano, Sebastiano M.; and Halpin, Paul, to American Cyanamid Company. Apparatus for remote marking of articles of manufacture. 3,730,133, Cl. 118-2.000.
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Cornell, Robert W., to United Aircraft Corporation. Torsional elastomer snubber. 3,730,015, Cl. 74-424.80r.
Corrado, Henry R. Football board game apparatus. 3,730,528, Cl. 273-134.0ad.
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Coulson, Gordon Raymond. Mineral dressing centrifuge. 3,730,423, Cl. 233-38.000.
Coupland, John Herbert, to Science Research Council. Electrical coils for generating magnetic fields. 3,731,241, Cl. 335-213.000.
Courtaulds Limited: *See—*
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Cowpland, Michael C.; and Draper, Donald A., to Microsystems International Limited. Impedance matching circuit for tone ringing. 3,731,004, Cl. 179-84.00t.
Cox, Rodney S. Universal joint trailer hitch with coupling pin socket aligning and bearing means. 3,730,557, Cl. 280-504.000.
Coyle, Edward L.; and Schipper, Dennis J., to ACF Industries, Incorporated. Railway car having a heated fresh air intake. 3,731,053, Cl. 219-202.000.
Crane, Burke J.; D'Hooge, Richard E.; and Roberts, Frank D., to Rixson-Firemark, Inc. Latching lever assembly for door holder-closer. 3,729,771, Cl. 16-48.500.
Crawford, John H., to Leading Plywood Corporation. Apparatus for laying up multiple-ply cross-bonded plywood panels. 3,730,816, Cl. 156-559.000.
Cremeans, George E.; Berry, David A.; Rosenberg, Harvey S.; Genco, Joseph M.; and Morrison, David L., to United States of America, Atomic Energy Commission. Scavengers for radioactive iodine. 3,730,833, Cl. 176-37.000.
Creusot-Loire: *See—*
Namy, Philippe, 3,730,254.
Critcher, John L., to AAI Corporation. Underwater pistol. 3,729,853, Cl. 42-65.000.
Cruvellier, Paul E.; and Duban, Michel, to Centre National d'Etudes Spatiales. Monochromators with concave spherical gratings. 3,730,626, Cl. 356-101.000.
Cryer, Edward, to Lucas, Joseph, (Industries) Limited. Handbrake controls for road vehicles. 3,731,272, Cl. 340-69.000.
Csontos, Alan A., to Goodrich, B. F., Company, The. Preparation of liquid bromine-terminated polymers. 3,730,862, Cl. 204-163.00r.
Culbertson, Billy M., to Ashland Oil, Inc. Amide oxadiazole polymers and polymer precursors. 3,730,952, Cl. 260-78.00a.
Cummings, Jerry W., to North American Rockwell Corporation. Explosive apparatus. 3,730,093, Cl. 102-6.000.
Cunningham, Andrew E.: *See—*
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Cunningham, Jack W.; Foster, E. Gordon; and Vanderwater, Robert G., to Shell Oil Company. Recovery of ethylene oxide from admixed inert gaseous components. 3,729,899, Cl. 55-44.000.
Curran, Peter J.: *See—*
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Cushman Industries, Incorporated: *See—*
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Cuthbert, John David; Hensler, Donald Henry; and Orr, William Harold, to Bell Telephone Laboratories, Incorporated. Fabrication of integrated optical circuits. 3,730,720, Cl. 96-38.300.
Cwycyshyn, Walter; and Kitchen, Elwyn L., Jr., to General Motors Corporation. Sensor. 3,730,004, Cl. 73-514.000.
Cziesla, Manfred J.: *See—*
Mueller, Kurt F.; and Cziesla, Manfred J., 3,730,789.
Daehnert, Raymond H., to Allied Chemical Corporation. Harvesting aid. 3,730,703, Cl. 71-69.000.
Dahl, Einar S.; and Kidd, Earl H., to Outboard Marine Corporation. Rotary lawn mower with safety features. 3,729,911, Cl. 56-320.200.
Dahlberg, John R.; Oravitz, James L., Jr.; and Michalik, Edmund R., to PPG Industries, Inc. Thermally directed glass cutting. 3,730,408, Cl. 225-2.000.
Daiker, Artur Lvovich; Morozov, Alexandr Nikolaevich; Veis, Anatoly Ivanovich; Kushtuev, Boris Grigorievich; Novoselov, Nikolai Mikhailovich; Zhuravlev, Viktor Nikolaevich; Zinoviev, Alexei Fedorovich; Alfeev, Ivan Ivanovich; Nikitin, Viktor Ivanovich; Kocergin, Alexei Ilich; Matashkov, Vladimir Filippovich; Karelin,

Nikolai Ivanovich; Volchematiev, Jury Venediktovich; Zaluzhentsev, Veniamin Fedorovich; and Morozov, Gennady Yakovlevich. Workpiece scarfing device. 3,730,504, Cl. 266-23.00h.

Daimler-Benz Aktiengesellschaft: *See—*
Bruder, Werner; and Grieb, Hubert, 3,730,649.
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Scherenberg, Hans O., 3,730,300.
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Dake Corporation: *See—*
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Dale, Warren R. One-bolt mount. 3,730,242, Cl. 151-41.700.

Dale, Warren R. Quick mount. 3,730,472, Cl. 248-300.000.

Dalglish, Herbert Francis. Light guided center lift. 3,730,368, Cl. 214-653.000.

D'Allessandro, William J., to Union Carbide Corporation. Compositions containing microspheres and friction elements produced therefrom. 3,730,920, Cl. 260-2.50b.

D'Amico, Thomas V.: *See—*
Schwendeman, Robert J.; D'Amico, Thomas V.; Petrakos, Nicholas; and Hagiwara, Shoji, 3,731,200.

Damon Corporation: *See—*
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Dancis, Douglas E.; Dorfuss, Gerald E.; and Zitron, Benjamin C., to Allied Management & Systems Corporation. Multifunction routing network. 3,731,282, Cl. 340-172.500.

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Lund, Egon, 3,729,832.

Danhauser, Justus, to Agfa-Gevaert Aktiengesellschaft. Photographic dye diffusion transfer process. 3,730,718, Cl. 96-29.00d.

Daniels, Charles K.; and McCarthy, John P., to EG & G, Inc. Underwater guidance method and apparatus. 3,731,263, Cl. 340-3.00r.

Danley, Allen M.: *See—*
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Danzey, Lee B.: *See—*
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Darrow, John O. G., to Westinghouse Air Brake Company. Vital vehicle brake assuring circuit arrangement. 3,731,193, Cl. 324-162.000.

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Data Packaging Corporation: *See—*
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Data Printer Corporation: *See—*
Satas, Wallace J.; and Konkel, Joseph, 3,730,449.

Data-Plex Systems, Inc.: *See—*
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Datamarine International Inc.: *See—*
Eck, Calvert F.; and Hill, Howard H., 3,729,993.

Daubach, Ewald: *See—*
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Dauterman, Walter E., to Harris-Intertype Corporation. Printing press film sensor. 3,730,086, Cl. 101-148.000.

Davis, Ariel R. Inductive winding. 3,731,243, Cl. 336-61.000.

Davis, John Christopher Hammond, to Handel Plessey und Investments AG. Methods of detecting rotation speed. 3,731,301, Cl. 340-347.00p.

Davison, Ellison L., to Mine Safety Appliances Company. Pneumatically operated ventilator. 3,730,180, Cl. 128-145.600.

Davison, Fred E. Wind power machine. 3,730,643, Cl. 416-8.000.

Davy and United Engineering Company, Limited: *See—*
Bathory, Bela Istvan, 3,730,036.
Sturdy, Clifford; and Hill, Geoffrey Douglas, 3,730,329.

Davy, Christopher G.: *See—*
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Dawson, Joseph, (Holdings) Limited: *See—*
Smith, Geoffrey Allan; and Laidlaw, Alan James, 3,730,676.

de Bruyne, Pieter, to RCA Corporation. Vibrating web transport apparatus. 3,731,317, Cl. 346-107.00r.

De Carbon, Christian Bourcier. Floating pistons. 3,730,060, Cl. 92-249.000.

De Good, Maynard J., to Rapistan Incorporated. Sensor locking accumulator. 3,730,330, Cl. 198-127.00r.

de Laine, Robert James; and Geary, William Richard Clifford. Sprinkler irrigation systems. 3,730,211, Cl. 137-344.000.

De Lano, Merritt V., Jr.: *See—*
McCarthy, William C.; and De Lano, Merritt V., Jr., 3,730,690.

De Palma, Ted V.; and Perga, Martin W., to Universal Oil Products Company. Method and means for catalytically treating engine exhaust gases. 3,729,936, Cl. 60-274.000.

De Rouen, Joseph R.; Baldwin, Kenneth B.; and Martin, Henry F., to Bourns, Inc. Method of making rotatable element potentiometer. 3,729,817, Cl. 29-610.000.

de Troyler, Georges D.: *See—*
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de Varda, Giuseppe: *See—*
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de Varda, Giuseppe, 70% to Montecatini Edison S.p.A. and and 30% to said de Varda, Giuseppe. Multicell furnaces for the production of aluminum by electrolysis. 3,730,859, Cl. 204-67.000.

Dean, Harold F., to Clark Equipment Company. Dual steering system. 3,730,288, Cl. 180-79.20r.

Deane, William Ronald, 30% to Bishop, Harold A., 15% to Curran, Peter J. and 25% to Sinclair, Matthew P. Rotary valve. 3,730,161, Cl. 123-190.00d.

Deaton, David W., to Ahldea Corporation. Stimulation method and apparatus for attempting to return a physiological parameter of a patient to normal. 3,730,173, Cl. 128-2.080.

Debray, Maurice. Pack advancer. 3,730,516, Cl. 271-62.00r.

Decca Limited: *See—*
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Decker, Donald R., Jr.: *See—*
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Dederra, Carl-Helmut: *See—*
Schmidt, Gunther; Theiss, Armin; Dederra, Carl-Helmut; and Kaiser, Leonnard, 3,729,793.

Deeks, Ronald G., to Procor Limited. Gas vent. 3,730,200, Cl. 137-1.000.

Deere & Company: *See—*
Oelschlaeger, George Frederick, 3,730,280.

Deese, Samuel H. Foldable extension ladder. 3,730,295, Cl. 182-163.000.

Deglan, Helmut W. Multi-purpose bulldozer blade. 3,729,844, Cl. 37-117.500.

Degnan, William G., to United Aircraft Corporation. Collapsible shim for preloaded bearing and method of making same. 3,730,600, Cl. 308-244.000.

Deiner, Hans; and Singer, Heinrich, to Chemishe Fabrik Pfersee GmbH. Process for improving the slipping resistance and the delustering of textiles. 3,730,762, Cl. 117-139.5cq.

Del Monica, Peter P. Bender for wire or flat stock. 3,729,975, Cl. 72-388.000.

Del-Frate, Claude, to Ets J.J. Carnaud & Forges de Basse-Indre. Linear clinching for round cans. 3,730,118, Cl. 113-30.000.

Delbar Products, Inc.: *See—*
Bowers, William H., 3,730,474.

Delignieres, Robert; and Ausset, Alain, to Institut Francais de Petrole des Carburants et Lubrifiants. Frequency tracking device. 3,731,204, Cl. 328-134.000.

DeLigt, John, to Westvaco Corporation. Embosser using small diameter embossing rolls. 3,730,080, Cl. 101-23.000.

Delta Manufacturing, Inc.: *See—*
Iddings, Michael D., 3,730,451.

Delzenne, Gerard Albert, to Gevaert-Agfa N.V. Light-sensitive photopolymerizable material containing photochromic material. 3,730,734, Cl. 96-115.00r.

Demetroiu, James A., to Bio-Science Laboratories. Thyroxine determination method employing the competitive protein binding technique. 3,730,684, Cl. 23-230.00b.

Dempco, Inc.: *See—*
Vik, Albam M., 3,730,221.

Denki Onkyo Co., Ltd.: *See—*
Masuda, Noboru, 3,731,074.

Denki Onkyo, Ltd.: *See—*
Masuda, Noboru; Kuroyanagi, Masahi; and Kase, Hiroaki, 3,731,007.

Denlinger, George William: *See—*
Cahill, Lysle D.; and Denlinger, George William, 3,730,011.

Denning, Ralph Murch; Wiltshire, Reginald Harold; and Woodward, Clifford Stanley, to United Kingdom of Great Britain and Northern Ireland, Secretary of State for Defense in Her Britannic Majesty's Government of the. Gas turbine engines. 3,729,934, Cl. 60-26.00r.

Denning, William G. De-smoger. 3,729,900, Cl. 55-100.000.

Dennison, David S., Jr.: *See—*
Turner, Stephen, Jr., 3,730,549.

Depa, Louis S.: *See—*
Lambert, Gary R.; and Depa, Louis S., 3,730,090.

Desarzens, Dominique Patrice. Non boil-over cooking assembly. 3,730,167, Cl. 126-386.000.

Design Systems, Inc.: *See—*
Streander, George W., 3,730,631.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Knorre, Helmut, 3,730,757.

Dewey, Clarence Forbes, Jr., to Massachusetts Institute of Technology. Laser system for producing wavelength-tunable optical radiation. 3,731,110, Cl. 307-88.300.

Dezuba, George P.; Berger, Abe; and Selin, Terry G., to General Electric Company. Self-bonding, heat-curable silicone rubber. 3,730,932, Cl. 260-29.1sb.

D'Hooge, Richard E.: *See—*
Crane, Burke J.; D'Hooge, Richard E.; and Roberts, Frank D., 3,729,771.

Di Matteo, Bartolo: *See—*
Di Matteo, Vincent J., Sr.; Di Matteo, Bartolo; and Di Matteo, Vincent J., Jr., 3,730,020.
Di Matteo, Vincent J., Sr.; Di Matteo, Bartolo; and Di Matteo, Vincent J., Jr., 3,737,020.

Di Matteo, Vincent J., Jr.: *See—*
Di Matteo, Vincent J., Sr.; Di Matteo, Bartolo; and Di Matteo, Vincent J., Jr., 3,730,020.
Di Matteo, Vincent J., Sr.; Di Matteo, Bartolo; and Di Matteo, Vincent J., Jr., 3,737,020.

Di Matteo, Vincent J., Sr.; Di Matteo, Bartolo; and Di Matteo, Vincent J., Jr. Connecting rod and cap construction. 3,730,020, Cl. 74-579.00e.

Di Matteo, Vincent J., Sr.; Di Matteo, Bartolo; and Di Matteo, Vincent J., Jr. Connecting rod and cap construction. 3,737,020, Cl. 74-579.00e.

Di Tullio, Joseph G.; Sommers, Donald J.; and Wright, Windsor D., to GTE Sylvania Incorporated. Independently adjustable dual polarized diplexer. 3,731,236, Cl. 333-9.000.

Dibrell, James W.; Pennington, James; and Schutz, Frank C., to Nospil Limited. Non-spill drinking cup top. 3,730,399, Cl. 222-482.000.

Diccianni, Anthony M., to Laminar Flow, Inc. Filtering device. 3,729,905, Cl. 55-490.000.

Dichter, Jakob. Machine for working articles of thermoplastic materials. 3,730,699, Cl. 65-237.000.

Dick, Melvin E., to General Motors Corporation. Engine mount assembly. 3,730,462, Cl. 248-10.000.

Dickey, John W., to Fifth Third Bank, The, mesne. Method of heat sealing a pair of closures with a magnetic susceptible material and high frequency alternating and steady magnetic fields. 3,730,804, Cl. 156-272.000.

Dickey, K. Shirlan, to Hewlett-Packard Company. Paper transport structure for recorder comprising foldable face plate. 3,731,318, Cl. 346-145.000.

Dickinson, Bryan J., to FMC Corporation. Air motor. 3,730,054, Cl. 91-491.000.

Dickstein, Jack: *See—*
Stehle, Peter Fallon; Dickstein, Jack; and Loshaek, Samuel, 3,730,933.

Diebold, Adolf; Sinn, Richard; and Schnell, Georg, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Manufacture of abrasion-resistant magnetic recording media. 3,730,852, Cl. 204-38.00b.

Dienes, Andrew; Ippen, Erich Peter; Kogelnik, Herwig Werner; and Shank, Charles Vernon, to Bell Telephone Laboratories, Incorporated. Compensated folded resonator. 3,731,224, Cl. 331-94.500.

Dierssen, Gunther H., to Minnesota Mining and Manufacturing Company. Process for producing a parallel overgrowth for use as an epitaxial thin film laser. 3,730,764, Cl. 117-201.000.

Dietch, Leonard, to Zenith Radio Corporation. Re-etch process for color cathode-ray tube. 3,730,809, Cl. 156-345.000.

Dillon, Janus J., to FEI, Inc., mesne. Method for washing and chilling eviscerated fowl. 3,729,773, Cl. 17-11.000.

Dimension Weld International, The: *See—*
Kuroda, Minoru, 3,730,814.

Dimitracopoulos, Panayotis C. Audio and audiovisual apparatus with pincers-like rotating arm. 3,730,618, Cl. 353-19.000.

Disch, Karlheinz; Krings, Peter; Kuhling, Dieter; Bellinger, Horst; and Perner, Johannes Jurgen, to Henkel & Cie GmbH. Scouring agents with a bleaching and disinfecting action. 3,730,902, Cl. 252-99.000.

Disko, Harry, to Glass, Marvin, and Associates. Children's playhouse. 3,729,881, Cl. 52-280.000.

Ditullio, Joseph G.; Parad, Leonard I.; and Story, Kenneth E., to GTE Sylvania Incorporated. Dual polarized diplexer. 3,731,235, Cl. 333-6.000.

Dixon, Jerry D.: *See—*
Commander, Robert D.; and Dixon, Jerry D., 3,731,177.

Dixon, Reginald John: *See—*
Gilbert, Harold James; and Dixon, Reginald John, 3,730,030.

Dixon, Richard E., executor: *See—*
Knox, John A.; Smith, John A.; Stout, Roy F., deceased, 3,730,901.

Dobell, Curzon, to Aquavoir Holding Company S.A. Method and apparatus of collecting rainwater. 3,730,120, Cl. 114-.50r.

Domann, Helmut: *See—*
Burgholte, Alwin; Wirtz, Rainer; and Domann, Helmut, 3,731,169.

Domtar Limited: *See—*
Bodycomb, Alistair K., 3,730,061.

Donerson, Robert L.: *See—*
Buckman, John D.; Raths, Fred W.; Boggs, Pamela P.; and Donerson, Robert L., 3,730,888.

Donofrio, Donald E. Stroke indicating golf club. 3,730,529, Cl. 273-186.00a.

D'Onofrio, Mario L., to Turbotec, Incorporated. Tubing unit with helically corrugated tube and method for making same. 3,730,229, Cl. 138-114.000.

Doornbos, William A., 1/2 to Beall, Richard W., Jr. Finger mask and apparatus for polishing fingernails. 3,730,191, Cl. 132-73.600.

Dorfuss, Gerald E.: *See—*
Dancis, Douglas E.; Dorfuss, Gerald E.; and Zitron, Benjamin C., 3,731,282.

Douglass, Richard W., to Norton Company. Fibered metal powders. 3,729,794, Cl. 29-182.100.

Dow Chemical Company, The: *See—*
Burkett, Francis L., 3,730,420.
Dunn, James L., Jr.; Renfro, James C.; and Goode, John V., 3,731,297.
Giampalmi, John J., Jr.; and Oldford, William G., 3,730,347.
Katzer, Melvin F.; and Routson, Willis G., 3,730,203.
Mitchell, John S., 3,730,470.
Smith, Harry A.; and Rooker, Bobbie E., 3,730,807.
Tomalia, Donald A.; and Sheetz, David P., 3,730,915.

Dow Corning Corporation: *See—*
Isquith, Alan J.; Abbott, Eugene A.; and Walters, Patrick A., 3,730,701.

Dowd, James Patrick. Mixed aluminum silicon coatings compositions. 3,730,914, Cl. 260-2.00s.

Dowdeswell, Charles Vernon Roger. Reversible plough support means with alternately laterally swinging wheel support arm. 3,730,279, Cl. 172-212.000.

Dowler, Warren L.: *See—*
United States of America, National Aeronautics and Space Administration, 3,729,935.

Downing, Todd R., to Maremont Corporation. Clamp assembly with tubular saddle member. 3,729,782, Cl. 24-277.000.

Dowty Technical Developments Limited: *See—*
Boydell, Kenneth Raymond, 3,730,220.
Lambeth, Dennis Ernest, 3,730,656.

Drapcho, Joseph E., to Minneapolis Society of Fine Arts, The. Children's toy with resilient base supporting resilient obstacles. 3,730,518, Cl. 272-1.00r.

Draper, Donald A.: *See—*
Cowpland, Michael C.; and Draper, Donald A., 3,731,004.

Drexhage, Karl H., to Eastman Kodak Company. Phenoxazine dye lasers. 3,731,222, Cl. 331-94.500.

Driscoll, William T., to Eastman Kodak Company. Process for making paper. 3,730,830, Cl. 162-146.000.

Drugmand, Lester D., to Emerson Electric Co. Heating and cooling units. 3,730,262, Cl. 165-46.000.

Drummond, Warren W., to PPG Industries, Inc. Apparatus for combining textile strands. 3,730,813, Cl. 156-441.000.

Drutchas, Gilbert H.; Clark, Hubert M.; and Melendy, Harold A., to TRW Inc. Variable delivery pump. 3,730,653, Cl. 418-32.000.

Du Pont de Nemours, E. I., and Company: *See—*
Bowen, Braxton C.; and Weir, Jackie A., 3,730,680.
Chu, Victor Fu Hua; and Cohen, Abraham Bernard, 3,730,717.
Etchells, Arthur William, III, 3,730,916.
Jaffe, Edward E., 3,730,955.
Prohaska, Charles Anton, 3,730,685.
Teti, John; and Violette, Jerome Carlton, 3,730,918.

Duban, Michel: *See—*
Cruvellier, Paul E.; and Duban, Michel, 3,730,626.

Ducol, Jean-Paul, to Centre Technique Industriel dit: Institut Textile de France. Rachel type looms. 3,729,954, Cl. 66-86.000.

Dunbar, Elton E.: *See—*
Whitman, Garo Arevian; Boothroyd, Wilson P.; and Dunbar, Elton E., 3,731,067.

Duncan, Maurice: *See—*
Stewart, David Bruce; Newtyle, Angus; Main, John; Kettins, Angus; and Duncan, Maurice, 3,730,802.

Dunlop Holdings Limited: *See—*
Nebout, Noel, 3,730,059.

Dunn, James L., Jr.; Renfro, James C.; and Goode, John V., to Dow Chemical Company, The. Apparatus for detecting the acid formation in liquid solvents. 3,731,297, Cl. 340-248.000.

Dunn, Lloyd G.; Morran, James R.; and Peters, Donald L., to Aluminum Company of America. Container body and a method of forming the same. 3,730,383, Cl. 220-66.000.

Dunn, R. S.; and Rife, William J., to Neet Products Incorporated. Roof lock assembly method. 3,729,884, Cl. 52-747.000.

Dunn, William C.: *See—*
Lenk, Pedro A.; Dunn, William C.; and Mina, Ramses R., 3,731,275.

Dupras, Stanley: *See—*
Ekonen, Martin A.; and Dupras, Stanley, 3,730,481.

Durham, Daniel R.; and Hamilton, William W., to Westinghouse Electric Corporation. Bus duct convertible from A.C. use to D.C. use. 3,730,971, Cl. 174-68.00b.

Durran, Donald A.: *See—*
Spencer, Donald J.; Durran, Donald A.; and Bixler, Henry A., 3,731,221.

Dutchburn, Leslie G. Means for removable attachment of a load supporting assembly to a surface. 3,730,467, Cl. 248-243.000.

Dutta, Pulin Kumar, to Plessey Handel und Investments AG. Wound-film dry capacitors. 3,731,130, Cl. 317-258.000.

Dybdal, Richard K.: *See—*
Benzon, Robert O.; and Dybdal, Richard K., 3,730,332.

Dye, John F.: *See—*
Binard, William J.; and Dye, John F., 3,730,209.

Dyna-Flex Corporation: *See—*
Bunker, Richard D., 3,730,069.

Dynamit Nobel AG: *See—*
Helfgenl, Werner; and Rohde, Wilhelm, 3,730,097.
Richter, Ulf, 3,730,415.

Dynamit Nobel Aktiengesellschaft: *See—*
Prior, Josef, 3,730,096.

Dzus Fastener Co., Inc.: *See—*
Smith, Howard John Leonard, 3,730,243.

E. F. Industries, Inc.: *See—*
Velten, Robert H., 3,730,791.

E-Z Por Corporation: *See—*
Levin, Myron M., 3,730,076.

Early California Industries, Inc.: *See—*
Nelson, Kenneth E., 3,730,890.

Eastman Kodak Company: *See—*
Abbott, Thomas I., 3,730,713.
Abbott, Thomas Irving, 3,730,724.

Brown, Morris E., 3,730,454.
Drexhage, Karl H., 3,731,222.
Driscoll, William T., 3,730,830.
Ettischer, Helmut; Ort, Wolfgang; Simon, Horst; and Steisslinger, Kurt, 3,730,066.
Gilman, Paul Brewster, Jr.; Raleigh, Ronald George; and Koszelak, Thaddeus Donald, 3,730,723.
Kerr, William C., 3,730,753.
Olivares, Ismael Adolfo; Bean, Frederic Roland; and Haist, Grant Milford, 3,730,727.
Seely, Neil G., 3,730,067.
Streiffert, John G.; and Muka, Edward, 3,731,006.
Williams, John; and Gilman, Paul, 3,730,721.

Easton, Rufus, to Koppers Company, Inc. Spray cooling for continuous cast strand. 3,730,258, Cl. 164-283.000.

Eaton Corporation: *See—*
Jaeschke, Ralph L., 3,730,317.
Keene, Derek K.; and Miller, Edward W., 3,730,369.
Liddell, Arlyn G., 3,730,017.
Pipes, George R., 3,730,102.

Eaton Yale & Towne, Inc.: *See—*
Trocme, Claude M., 3,730,053.

Ebara Infilco Kabushiki Kaisha: *See—*
Suzuki, Hidetomo; Arimitsu, Hidenobu; and Tanaka, Shigemasa, 3,730,887.

Eberle, William J., to General Battery Corporation. Battery testing and crimping device. 3,729,799, Cl. 29-204.000.

Eby, Richard L.: *See—*
Sharaf, Harold M.; and Eby, Richard L., 3,731,189.

Eck, Calvert F.; and Hill, Howard H., to Datamarine International Inc. Digital knotmeter and log. 3,729,993, Cl. 73-181.000.

Eckard, Robert Lewis, to U.S. Plywood-Champion Papers Inc. Interchangeable side panel and the like for modular furniture. 3,730,605, Cl. 312-257.000.

Ecodyne Corporation: *See—*
Weis, Frank G.; and Wood, Marvin E., 3,730,348.

Edele, Reinhard; Kohler, Alfred; and Bauer, Kurt, to SWF-Spezialfabrik fur Autozubehoer Gustav Rau GmbH. Device for fastening a windshield wiper arm on a drive shaft. 3,729,767, Cl. 15-250.340.

Edmund, James Mitchell. Safety ski binding. 3,730,543, Cl. 280-11.35t.

Edmunds, Louis Henry, Jr.; and Braley, Silas A., to University of California, The Regents of the. Adjustable implantable artery-constricting device. 3,730,186, Cl. 128-325.000.

Edwards, Grant C.: *See—*
Albers, Edwin W.; and Edwards, Grant C., 3,730,910.

Edwards, Haze D.; and Peck, William L. Lantern holder. 3,730,471, Cl. 248-274.000.

Edwards, William R., to United States of America, Navy. Apparatus for quick-blossoming chaffe ejection. 3,730,098, Cl. 102-34.400.

Efanov, Boris Fedorovich: *See—*
Maksutov, Rafkhat; Asfandiyarov, Khalim Akhmetovich; Pashin, Vasily Fedorovich; Gubarev, Yakov Fedorovich; Sadykov, Riffgat Suleimanovich; Akhunov, Albert Musagitovich; Vakhitov, Gadel Galyautdinovich; Graifer, Valery Isaakovich; Zyalyaev, Vagiz Murzakhanovch; Kostrjukov, Gennady Vasilievich; and Efanov, Boris Fedorovich, 3,729,803.

Efanova, Olga Iosifovna: *See—*
Maksutov, Rafkhat; Asfandiyarov, Khalim Akhmetovich; Pashin, Vasily Fedorovich; Gubarev, Yakov Fedorovich; Sadykov, Riffgat Suleimanovich; Akhunov, Albert Musagitovich; Vakhitov, Gadel Galyautdinovich; Graifer, Valery Isaakovich; Zyalyaev, Vagiz Murzakhanovch; Kostrjukov, Gennady Vasilievich; and Efanov, Boris Fedorovich, 3,729,803.

EG & G, Inc.: *See—*
Daniels, Charles K.; and McCarthy, John P., 3,731,263.

Egan, James John; Kimmel, Millard Edward; Strohl, Ronald Irwin; and Wanesky, William Robert, to Western Electric Company, Incorporated. Microscopically inspecting and sorting articles. 3,730,342, Cl. 209-122.000.

Eggert, Walter S., Jr., to Budd Company, The. Decelerating apparatus. 3,730,586, Cl. 297-216.000.

Eichmann, Dieter; Heyer, Gunter; Schaff, Ulrich; and Voigt, Gunter, to Siemens Aktiengesellschaft. Digital compact control module. 3,731,120, Cl. 307-213.000.

Eilhardt, Bernd: *See—*
Weichardt, Helmut; Glander, Fritz; Ziemek, Gerhard; Schuppe, Walter; Meyer, Hans; and Eilhardt, Bernd, 3,729,919.

Ejlertsen, Bent, to Nielsen, H., & Son Maskinfabrik A/S. Steel section handling mechanism. 3,729,798, Cl. 29-200.00a.

Ekonen, Martin A.; and Dupras, Stanley. Air lift jack. 3,730,481, Cl. 254-93.00r.

Elam, Charles F., to General Motors Corporation. Fuel fitting. 3,730,493, Cl. 261-4.000.

Elam, Charles F., to General Motors Corporation. Carburetor accelerator pump. 3,730,495, Cl. 261-34.00a.

Eldridge, Brice; Davy, Christopher G.; and Michals, Richard A., to Stenographic Machines, Inc. Data format conversion system. 3,731,278, Cl. 340-172.500.

Electro Mechanical Instrument Company, Inc.: *See—*
Wohlbach, Harry E., 3,731,303.

Electrospace Corporation: *See—*
Meri, Kalju, 3,731,008.

Elias, William; Valdes, Silverio Antonio; and Waybright, George Cleveland, to GTE Incorporated. Signal generating circuit for a deflection system. 3,731,138, Cl. 315-29.000.

Eliason, Carlyle R., to Eliason Corporation. Insulated wall construction. 3,729,880, Cl. 52-232.000.

Eliason Corporation: *See—*
Eliason, Carlyle R., 3,729,880.

Elkins, James H.: *See—*
Odum, William T.; Elkins, James H.; and Coggins, Thomas M., 3,730,122.

Ellenberger & Poensgen GmbH: *See—*
Ellenberger, Jakob, 3,731,239.

Ellenberger, Jakob, to Ellenberger & Poensgen GmbH. Excess current switch. 3,731,239, Cl. 335-167.000.

Ellersick, Russell R. Articulated radiant heating modules. 3,731,051, Cl. 219-162.000.

Elliott, George E.: *See—*
Christman, Robert D.; Elliott, George E.; and Guelfi, Guglielmo, 3,730,879.

Elliott, Richard M., to Associated Electrical Industries Limited. Mass spectrometer ion source having means for rapidly expelling ions from the source and method of operation. 3,731,089, Cl. 250-41.9sb.

Ellis, Lonnie T. Pump and folding support arrangement therefor. 3,730,651, Cl. 417-554.000.

Ellman, Irving A. Electrosurgical apparatus for dental use. 3,730,188, Cl. 128-303.140.

Eloranta, Vaito K., to Polaroid Corporation. Headlamp polarizing attachment. 3,731,080, Cl. 240-9.500.

Elsbett, Gunter; and Elsbett, Ludwig, to Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft Werk Nurnberg. Piston for injection type internal combustion engines. 3,730,163, Cl. 123-193.00p.

Elsbett, Ludwig: *See—*
Elsbett, Gunter; and Elsbett, Ludwig, 3,730,163.

Emerson Electric Co.: *See—*
Drugmand, Lester D., 3,730,262.
Kozbelt, Lloyd S., 3,730,373.

Emerson, Frank W., to General Time Corporation. Drive arrangement for timekeeping system. 3,729,925, Cl. 58-23.00d.

EMF Corporation: *See—*
Sherman, Lawrence V.; Marson, Richard A.; Keeler, Jack D.; and Fagan, Edmund I., 3,731,149.

Emhart Corporation: *See—*
Gardner, Edward Boyd, 3,731,205.
Gerlach, John R., 3,730,578.

EMI Limited: *See—*
Cochrane, Peter Ronald, 3,729,755.

Emmert, Reinhold, to Grundig EMV. Circuit for controlling the direction of current flow in a load impedance. 3,731,170, Cl. 318-257.000.

Emoto, Kazuhiro: *See—*
Futaki, Kiyoshi; Emoto, Kazuhiro; and Tsukahara, Hirokazu, 3,730,712.

Enabnit, Robert S.: *See—*
Lowe, Richard B.; and Enabnit, Robert S., 3,731,113.

Endo, Tadao: *See—*
Muramatu, Akira; and Endo, Tadao, 3,731,271.

Endo, Takaya: *See—*
Inoue, Isaburo; Endo, Takaya; Matsuo, Syunji; Taguchi, Masahiko; and Yamamoto, Toshihiko, 3,730,722.

Endo, Yoshinori: *See—*
Kwbo, Noriyoshi; Nakamura, Kazuhiro; Endo, Yoshinori; Katano, Takeshi; and Ichinohe, Eisuke, 3,731,228.

Energy Sciences Incorporated: *See—*
Hughes, Nathaniel, 3,730,160.

Engel, Walter H. Space volatilizing device. 3,730,434, Cl. 239-47.000.

English Electric Valve Company Limited: *See—*
Lewis, Peter Frederick, 3,731,140.

English, William H.: *See—*
Kapalko, Erwin J.; and English, William H., 3,730,865.

Enyeart, Raymond J.: *See—*
Leonard, George Hamlin; and Enyeart, Raymond J., 3,730,424.

Epoch Company, Ltd.: *See—*
Maeda, Taketora, 3,730,525.

Erickson, Raymond Kenneth: *See—*
Prisk, Bert C.; Erickson, Raymond Kenneth; and Wheatley, Marion E., 3,730,812.

Escoubas, Thomas A.: *See—*
Park, Raymond E.; and Escoubas, Thomas A., 3,730,482.

Espeel, Frans Joris; and Ackermann, Ernst. Pneumatic dust collection system. 3,729,903, Cl. 55-283.000.

Esso Production Research Company: *See—*
Penhollow, John O., 3,731,270.
Weiner, Peter D., 3,730,286.

Estradier, Francoise: *See—*
Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, 3,730,677.

Etablissements Genoud & Cie: *See—*
Chevallier, Pierre, 3,730,671.

Etchells, Arthur William, III, to Du Pont de Nemours, E. I., and Company. Process of treating microcellular polymeric staple fibers to render them postinflatable. 3,730,916, Cl. 260-2.50n.

Ethyl Corporation: *See—*
Lee, Thomas E.; and Frey, Frederick W., 3,730,445.

Ets J.J. Carnaud & Forges de Basse-Indre: *See—*
Del-Frate, Claude, 3,730,118.
Ettischer, Helmut; Ort, Wolfgang; Simon, Horst; and Steisslinger, Kurt, to Eastman Kodak Company. Film movement prevention means. 3,730,066, Cl. 95-31.00r.
Eunipp, AG: *See—*
Flisch, Hermann, 3,730,028.
European Atomic Energy Community: *See—*
Kottowski, Heinz; and Grass, Gunther, 3,730,266.
Evalds, Egils, to Athena Controls, Inc. Temperature control appartus employing heating and cooling control circuits arranged in a head to toe configuration. 3,730,819, Cl. 161-26.000.
Evequoz, Jean-Yves. Bobski. 3,730,546, Cl. 280-16.000.
Everest, Frank G.; and Veasey, Thomas P., to British Aircraft Corporation Limited. Electronic gating circuits. 3,731,117, Cl. 307-254.000.
EVG Entwicklungs- und verwertungsgesellschaft m.b.H: *See—*
Ritter, Klaus; Gott, Hans; Ritter, Gerhard; and Ritter, Josef, 3,731,042.
Eyelet Specialty Company: *See—*
Hultgren, Eric Alex, 3,730,664.
Ezell, Melvin H.; and Talley, Troy B. Hosiery inspection apparatus. 3,730,405, Cl. 223-72.000.
F. L. & J. C. Company: *See—*
Hall, Elisha Winthrop, Jr., 3,729,872.
Fabian, Wolfgang, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Isolation of finely divided dyes from liquid dispersions. 3,730,750, Cl. 106-309.000.
Fabriksaktiebobaget Eka: *See—*
Sandell, Torsten Wilhelm, 3,729,873.
Fabrique de Boites de Montres F. Kuhn SA: *See—*
Brigiliano, Florent; Vogt, Ernest; and Marmoud, Edmond, 3,729,923.
Facit AB, mesne: *See—*
Hjerpe, Curt, 3,730,083.
Fagan, Edmund I.: *See—*
Sherman, Lawrence V.; Marson, Richard A.; Keeler, Jack D.; and Fagan, Edmund I., 3,731,149.
Fairbanks, Roslyn H., to Inter Continental Corporation. Device for precision positioning of objects. 3,730,484, Cl. 254-167.000.
Fairchild, David Lee; and Lane, Michael Stephen, to Bell Telephone Laboratories, Incorporated. Multiple line scanning switching system. 3,731,001, Cl. 179-18.0ad.
Fairey Stainless Limited: *See—*
Thomas, Lindsay Maitland, 3,729,812.
Fairshare Marketing & Manufacturing Co., Inc.: *See—*
Bair, Lester E., 3,731,054.
Falconer, Errol Linton; and Finch, Gerhard Franz Otto Karl, to Canadian Industries Limited. Explosive composition containing a glycol and guar gum ether. 3,730,790, Cl. 149-44.000.
Faller, Edwin; and Faller, Hermann, to Gebr. Faller GmbH, Fabrik Feiner Modellspielwaren. Toy railroad vehicle and switching section. 3,729,866, Cl. 46-216.000.
Faller, Hermann: *See—*
Faller, Edwin; and Faller, Hermann, 3,729,866.
Famolare, Inc.: *See—*
Famolare, Joseph P., Jr., 3,729,840.
Famolare, Joseph P., Jr., to Famolare, Inc. Backless clog construction. 3,729,840, Cl. 36-2.50j.
Farah Manufacturing Co., Inc.: *See—*
Globus, Alfred R., 3,730,736.
Farb, Joseph L. Saw blade construction. 3,730,038, Cl. 83-837.000.
Farbenfabriken Bayer Aktiengesellschaft: *See—*
Lailach, Gunter; Gerlach, Gottfried; Trenczek, Gerhard; and Brandle, Karl, 3,730,748.
Farber, Sheldon; and Wright, Arthur John, to National Cash Register Company, The. Pressure sensitive recording sheet. 3,730,754, Cl. 117-36.200.
Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning: *See—*
Landauer, Franz; Beermann, Claus; Reuter, Martin; Lebkucher, Karl Heinz; and Kiesling, Hubert, 3,730,903.
Faris, Edwin E.: *See—*
Nesson, Israel; Palmer, Robert G.; Faris, Edwin E.; and Hertling, Charles J., 3,730,065.
Farney, Leonard C.: *See—*
Land, Edwin H.; Bloom, Stanley M.; and Farney, Leonard C., 3,730,716.
Fastener Corporation: *See—*
Mosetich, Ronald J.; and Mosetich, Joseph, 3,729,885.
Fastner, Thorwald; and Papp, Gerhard, to Vereimigte Osterreichische Eisen-und Stahlwerke Aktiengesellschaft. Method for the production of killed, unalloyed or low-alloy, aluminum containing steel with low carbon content. 3,730,704, Cl. 75-129.000.
Favin, David Leonard; and Snyder, Paul Jerry, to Bell Telephone Laboratories, Incorporated. Automatic time interval ranging circuit for delay interval measurements including uncertainty elimination. 3,731,194, Cl. 324-186.000.
Fedrigo, Renzo, to Olivetti, Ing. C., & C., S.p.A. High velocity press. 3,730,039, Cl. 83-170.000.
FEI, Inc., mesne: *See—*
Dillon, Janus J., 3,729,773.
Feinler, Raimund, to Maschinen-Konstruktions-Gesellschaft mit beschrankter Haftung, Firma. Adjustable mounting for shaft-supported elements. 3,730,569, Cl. 287-52.080.
Fekete, Frank; and Pulman, Leonard J., to Koppers Company, Inc. Production of composite fiber reinforced resin articles. 3,730,808, Cl. 156-332.000.
Feldman, Alter. Packaged liquid containers. 3,730,336, Cl. 206-47.00b.
Feldman, Burton G. Unitary hanger for displaying articles. 3,730,355, Cl. 211-59.000.
Felix, Gerardus L.; and Bennett, Frank C., to General Motors Corporation. Brake control system and vehicle having same. 3,730,596, Cl. 303-3.000.
Fellows, Harrison E. Method of making a sand mold. 3,730,250, Cl. 164-22.000.
Felner, Richard S., to United States of America, Army. Subaudible frequency indicator for doppler radar. 3,731,308, Cl. 343-7.700.
Felson, Raymond. Prefabricated building. 3,729,875, Cl. 52-79.000.
Fenco, Inc.: *See—*
Goldberg, Nathaniel D., 3,730,331.
Fernandez, Richard E.: *See—*
Vawter, Verne E.; and Fernandez, Richard E., 3,729,809.
Ferry, Kirk: *See—*
Blachut, Theodore J.; Paulun, Manfred; Ferry, Kirk; and Amaro, Angel Garcia, 3,729,830.
Fiber, Theodore. Shoe inner sole and orthopedic support. 3,730,169, Cl. 128-2.00s.
Fiedler, Berhard, to Maschinenfabrik Buckau R. Wolf Aktiengesellschaft. Method and apparatus for processing soluble crystals. 3,730,769, Cl. 127-19.000.
Field, Milton M.: *See—*
Belknap, Donald J., 3,729,783.
Fields, Walter M.; and Mayer, Richard W. Softwood-hardwood laminated panel. 3,730,820, Cl. 161-38.000.
Fifth Third Bank, The, mesne: *See—*
Dickey, John W., 3,730,804.
Filliung, Jacques J., to Sloan Valve Company. Breath operated flushing arrangements. 3,731,025, Cl. 200-81.90r.
Finch, Gerhard Franz Otto Karl: *See—*
Falconer, Errol Linton; and Finch, Gerhard Franz Otto Karl, 3,730,790.
Fingerle, Rudolf, to SKF Kugellagerfabriken GmbH. Bearing assembly for spinning rotors. 3,730,599, Cl. 308-187.000.
Finney, John S.: *See—*
Gilbert, Lloyd O.; and Finney, John S., 3,730,192.
Fischer & Proctor Co.: *See—*
Kovacs, Laszlo I.; and Schmoock, Roy F., 3,729,995.
Flaminaire Marcel Quercia: *See—*
Lambert, Jacques, 3,730,670.
Flanagan, Robert L., to Mobil Auto Crushers Corporation of America. Junk automobile crusher. 3,730,078, Cl. 100-48.000.
Fliesser, Engelbert, to Agfa-Gevaert Aktiengesellschaft. Cinematographic apparatus. 3,730,616, Cl. 352-166.000.
Fling, John J., to Sigma Engineering Company. Diaphragm ear valve. 3,730,181, Cl. 128-152.000.
Flint & Walling, Inc.: *See—*
Gordon, Donald L., 3,730,641.
Flippin, James S., to Barber-Greene Company. Self contained retaining means for removable digging tooth. 3,729,845, Cl. 37-142.00a.
Flisch, Hermann, to Eunipp, AG. Multiple spindle automatic lathe. 3,730,028, Cl. 82-3.000.
Flowers A La Karte, Inc.: *See—*
Looms, Peter, 3,730,603.
Fluid Device Corporation: *See—*
Richards, George B., 3,730,500.
Fluidtech Corporation: *See—*
Osheroff, Gene W., 3,730,430.
FMC Corporation: *See—*
Dickinson, Bryan J., 3,730,054.
Slemmons, Arthur J., 3,730,013.
Wenneborg, William Z.; Bunnelle, Philip R.; and Payne, Bobby R., 3,730,592.
Ford, James: *See—*
Caule, Elmer J.; Sperry, Philip R.; Pryor, Michael J.; and Ford, James, 3,730,779.
Ford, John E. Afro pic and high speed cold air blow combination. 3,730,190, Cl. 132-11.000.
Ford Motor Company: *See—*
Arnett, Lawrence E.; and Billock, Paul J., 3,730,216.
Boschen, John A.; and Francis, Reid E., 3,729,867.
Breitenbach, Lawrence P.; and Shelef, Mordecai, 3,730,686.
Colovas, Denny D.; Logan, John S.; and Skruch, Richard R., 3,730,583.
Fouts, Norman G., 3,730,305.
Harrison, Robert S.; and Marcum, Harold E., 3,730,153.
Keenon, Timothy R., 3,730,498.
Labana, Santokh S., 3,730,930.
Lang, Charles R.; and Schock, Donald N., 3,730,691.
Madejczyk, Leopold A., 3,730,866.
Stockton, Thomas R., 3,730,021.
Vartanian, Richard D., 3,730,154.
Ford Motors Company: *See—*
Camp, John W. A., 3,730,318.
Foreman, Robert J., to Raytheon Company. Coaxial magnetron with split ring tunes. 3,731,137, Cl. 315-39.770.
Foremost-McKesson, Inc.: *See—*

Rash, Kenneth E., Jr.; Colmey, John C.; and Zanzig, Charles E., 3,730,735.

Forgione, Peter Salvatore; and Polistina, Rocco Albert. Encapsulated carrier bound enzymes. 3,730,841, Cl. 195-63.000.

Formaini, Robert L.; and Little, Edwin D., to Allied Chemical Corporation. Polyurethane foams derived from tris (β-hydroxyalkyl) isocyanurate-alkylene oxide. 3,730,923, Cl. 260-2.5aq.

Fortin, Michael Joseph; Latchford, Joseph T.; and Vandenheuvel, Marinus Theodorus, to Fortin-Latchford Limited. Molding apparatus. 3,730,665, Cl. 425-259.000.

Fortin-Latchford Limited: *See—*
Fortin, Michael Joseph; Latchford, Joseph T.; and Vandenheuvel, Marinus Theodorus, 3,730,665.

Foster, E. Gordon: *See—*
Cunningham, Jack W.; Foster, E. Gordon; and Vanderwater, Robert G., 3,729,899.

Fournis, Jean-Francois, to Societe d'Appareillage Electrique Saparel. High-sensitivity differential relay protected against disturbances. 3,731,148, Cl. 317-18.00d.

Fouts, Norman G., to Ford Motor Company. Shock absorber piston. 3,730,305, Cl. 188-322.000.

Fox, John J., to Westinghouse Electric Corporation. Laundry dryer with oblique tumbling vanes. 3,729,834, Cl. 34-139.000.

Foy, Lawrence F. Safety enclosure for off-shore oil rigs. 3,730,278, Cl. 169-2.00r.

Francis, Reid E.: *See—*
Boschen, John A.; and Francis, Reid E., 3,729,867.

Franek, Jozef Tadeusz; and Rhodes, Peter, to Metal Box Company Limited, The. Can end opening means. 3,730,381, Cl. 220-54.000.

Frank, G. B., Incorporated: *See—*
Chandos, Laurence R., 3,729,847.

Franklin, Andrew T. Stick on insulators. 3,729,879, Cl. 52-173.000.

Franz, Norman J., to Procter & Gamble Company, The. Method of forming and adhering a web of material to the lower surface of a pad or the like. 3,730,798, Cl. 156-201.000.

Franzen, Gustav; Nimtz, Klaus; and Riefers, Horst, to Palitex Project-Company GmbH. Apparatus for use in connection with spooling and twisting machines for placing a thread reserve onto the winding bobbin. 3,730,447, Cl. 242-18.0pw.

Fraze, Ermal C.: *See—*
Brown, Omar L., 3,730,379.
Silver, Francis M., 3,730,380.

Freake, Stuart M.: *See—*
MacVicar, Margaret L. A.; Freake, Stuart M.; and Adkins, Clement J., 3,731,158.

Freeder, Herman; and Wilt, Homer E., to Goodrich, B. F., Company, The. High temperature brake disc. 3,730,320, Cl. 192-107.00m.

Freeland, Stanley R., to Bell & Howell Company. Motor driven camera focusing mechanism. 3,730,068, Cl. 95-44.00r.

Freeman, Lawrence M.; and Arnold, Francis T., to Micro Information Systems, Inc. Microfilm viewer-printer. 3,730,622, Cl. 355-14.000.

Freilino, Ray S., to Mine Safety Appliances Company. Non-dispersive infrared gas analyzer having sample and reference beams using flow sensitive detector and with unbalanced operation. 3,731,092, Cl. 250-43.50r.

French Oil Mill Machinery Company, The: *See—*
Mason, Gene C., 3,730,344.

Frey, Frederick W.: *See—*
Lee, Thomas E.; and Frey, Frederick W., 3,730,445.

Friden, John Frederick, to MFG Manufacturing Co. Hydraulic ram assembly. 3,730,057, Cl. 92-110.000.

Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
Knebel, Alfred, 3,729,933.

Frisbie, Jack G., to International Telephone and Telegraph Corporation. Circuit arrangement for generating radio frequencies. 3,731,201, Cl. 325-105.000.

Frohlich, Alfons; and Hochlehnert, Franz, to Opti-Holding AG. Apparatus for thermofixing of slide-fastener coupling chains. 3,730,817, Cl. 156-580.000.

Frost, Charles B.; and Gisler, Philip S., to Aerojet-General Corporation. Catalysis of reactions of aziridines used in preparing high energy composite propellants. 3,730,792, Cl. 149-19.000.

Fry, William Lawrence. Ignition coils. 3,731,246, Cl. 336-192.000.

Frydenberg, Donald V., to Clary Corporation. Apparatus for routing recesses in doors and the like. 3,730,236, Cl. 144-27.000.

Fuji Photo Film Co., Ltd.: *See—*
Akashi, Goro; Fujiyama, Masaaki; and Miyake, Tokuaki, 3,730,767.
Ono, Hisatake; and Watarai, Syu, 3,730,711.
Tsuji, Akira, 3,730,334.
Tsuji, Nobuo; Ono, Yoshiaki; Nishio, Fumihiko; and Ueda, Hirozo, 3,730,726.

Fuji Telecasting Company Ltd.: *See—*
Kono, Yoshinori; Iwasaki, Norio; Sato, Tosho; Mizuno, Masaya; and Takeuchi, Jikko, 3,730,975.

Fujiki, Yokyo Shun: *See—*
Oba, Yoichi; Kato, Hachioji; Tsunoda, Tokorozawa Teruo; Fujiki, Yokyo Shun; and Tsukuni, Hitachi Hajime, 3,730,913.

Fujimoto, Sakae, to Kabushiki Kaisha Ricoh. Apparatus for information retrieval. 3,730,619, Cl. 353-26.000.

Fujioka, Hideki: *See—*
Ogawa, Yasuhide; Kawase, Yutaka; Takada, Makoto; and Fujioka, Hideki, 3,731,052.

Fujiwara, Shohei, to Matsushita Electronics Corporation. Method of making thermo-compression-bonded semiconductor device. 3,729,807, Cl. 29-473.100.

Fujiyama, Masaaki: *See—*
Akashi, Goro; Fujiyama, Masaaki; and Miyake, Tokuaki, 3,730,767.

Fukami, Masaharu; and Okada, Takeshi, to Olympus Optical Co., Ltd. Endoscope. 3,730,175, Cl. 128-6.000.

Fukami, Mashakaru; Masaaki, Sato; and Toshiyuki, Mori. Air supplying device for an endoscope. 3,730,645, Cl. 417-12.000.

Fukuroi, Takeo, to Yoshida Kogyo Kabushiki Kaisha. Slider for concealed zip fasteners. 3,729,781, Cl. 24-205.14k.

Fukuzawa, Tsutomu: *See—*
Kobara, Kiyoshi; Fukuzawa, Tsutomu; and Uzihara, Yuzuru, 3,731,108.

Futaki, Kiyoshi; Emoto, Kazuhiro; and Tsukahara, Hirokazu, to Mitsubishi Paper Mills, Ltd. Photoconductive material for electrography. 3,730,712, Cl. 96-1.500.

Gabbard, Ova G.: *See—*
Schmidt, William G.; Gabbard, Ova G.; Husted, John M.; Maillet, Wilfrid G.; and Bos, Marinus A., 3,730,998.

G.A.C. International Inc.: *See—*
Baues, Dietrich; Marini, Richard; and McCauley, Donald, 3,729,824.

GAF Corporation: *See—*
Magnus, Bruno E., 3,730,397.

Gall, James W., to Phillips Petroleum Company. Method of selectively plugging a formation with a polymeric elastomer latex-brine mixture. 3,730,271, Cl. 166-294.000.

Galle, Edward M., to Hughes Tool Company. Well bore acoustic apparatus. 3,730,269, Cl. 166-177.000.

Gallogly, Donald R.; and Wheeler, William E. Seed and fertilizer spreader. 3,730,395, Cl. 222-145.000.

Garcia, Gilbert C. Live shrimp securing fishing lure. 3,729,851, Cl. 43-44.800.

Gardner, Edward Boyd, to Emhart Corporation. Sequence detector circuit. 3,731,205, Cl. 328-5.000.

Gardner, John A., Jr., to Jet Spray Cooler, Inc. Magnetic drive coupling for beverage dispenser. 3,730,488, Cl. 259-67.000.

Gardner-Denver Company: *See—*
Anderson, Floyd R.; and Sullivan, Donald N., 3,730,285.
Bos, John R.; Sorensen, Clarence A.; and Van Elzelingen, Laurens, 3,729,823.

Garey, Michael Randolph, to Bell Telephone Laboratories, Incorporated. Magnetic domain logic apparatus. 3,731,109, Cl. 307-88.0lc.

Garland Steel Company: *See—*
Gray, James H.; and Rood, William E., Jr., 3,729,909.

Garrett, Burton Robert. Bottle escapement device. 3,730,324, Cl. 198-24.000.

Garrity, William L.; and Tveras, Rimvydas Anthony. Collapsible bridge game. 3,730,519, Cl. 273-1.00r.

Gartner, Klaus W. Multiple part key for conventional locks. 3,729,965, Cl. 70-395.000.

Garza, Alejandro E. Gaujardo; and Garza, Gustavo Guajardo. Method of metal coating a fibrous sheet. 3,730,752, Cl. 117-11.000.

Garza, Gustavo Guajardo: *See—*
Garza, Alejandro E. Gaujardo; and Garza, Gustavo Guajardo, 3,730,752.

Gates Rubber Company, The: *See—*
Stark, Robert E., 3,730,772.

Gatsis, John G.: *See—*
Gleim, William K. T.; Gatsis, John G.; and O'Hara, Mark J., 3,730,875.

Gauye, Emmanuel V.: *See—*
Reinfeld, Kurt; and Gauye, Emmanuel V., 3,730,256.

Gaynor, Joseph, to Bell & Howell. Image transfer layers for infrared transfer. 3,730,091, Cl. 101-471.000.

Geary, William Richard Clifford: *See—*
de Laine, Robert James; and Geary, William Richard Clifford, 3,730,211.

Gebauer, Hans, to Hoesch Maschinen-Fabrik Deutschland Aktiengesellschaft. Method and apparatus for making a tube from a metal strip. 3,731,041, Cl. 219-62.000.

Gebr. Eickhoff Maschinenfabrik und Eisengiesserei m.b.H.: *See—*
Klein, Hugo, 3,730,810.

Gebr. Faller GmbH, Fabrik Feiner Modellspielwaren: *See—*
Faller, Edwin; and Faller, Hermann, 3,729,866.

Gehl Company: *See—*
Burrough, Donald E.; and Braunberger, Benjamin A., 3,729,907.

Gehman, John B., to General Dynamics Corporation. Object detection system using electro magnetic waves. 3,731,305, Cl. 343-5.0pd.

Gehweiler, William Frederick, to RCA Corporation. Two phase logic circuit. 3,731,114, Cl. 307-205.000.

Geisinger, Wolfgang: *See—*
Schramayr, Ernst; and Geisinger, Wolfgang, 3,730,404.

Geisler, Wilson S., Jr., to Lockheed Aircraft Corporation. Electric current generator and method using consumable alkali metal anode. 3,730,776, Cl. 136-100.00r.

Genco, Joseph M.: *See—*
Cremeans, George E.; Berry, David A.; Rosenberg, Harvey S.; Genco, Joseph M.; and Morrison, David L., 3,730,833.

General Battery Corporation: *See—*
Eberle, William J., 3,729,799.

General Dynamics Corporation: *See—*
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General Electric Company: *See—*
Bennett, James G.; and Katchman, Arthur, 3,730,944.
Cook, William K.; and Turley, Barry J., 3,731,121.
Dezuba, George P.; Berger, Abe; and Selin, Terry G., 3,730,932.
Gibson, James W.; Videtto, Donald A.; and Linse, Richard C., 3,729,969.
Harrington, Dean B., 3,731,127.
Heath, Darrell R.; and Wirth, Joseph G., 3,730,946.
Kunz, Raymond W.; and Schulz, Albert E., 3,731,057.
McKee, Douglas W.; and Scarpellino, Anthony J., Jr., 3,730,774.
Niedrach, Leonard W., 3,730,868.
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Rademaker, Leo C., 3,731,179.
Roussin, Alfred G., 3,731,136.
Rowen, William I., 3,729,928.
Simoneau, Edward T.; Moeller, Richard E.; and Holdstock, Norman G., 3,730,931.
Smith, Alfred H., Jr.; and Murphy, Robert A., 3,730,938.
Stein, Leonard, 3,730,765.
Van Luyn, Robert, 3,731,295.
Weiser, Earnest F., 3,731,150.
Wright, Archibald N.; and Mathewson, Wilfred F., 3,729,814.

General Electric Corporation: *See—*
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General Instrument Corporation: *See—*
Seely, John Leland; Cohen, Leo; Colino, Ronald P.; and Pace, Robert E., 3,731,287.

General Mills, Inc.: *See—*
Strommer, Palmer K., 3,730,729.

General Motors Corporation: *See—*
Albers, Walter A., Jr.; Bleil, Carl E.; and Swets, Don E., 3,730,867.
Annis, Robert E.; and Cheek, Forrest R., 3,730,315.
Arlauskas, Alfonsas; and Rogers, Lloyd W., Jr., 3,730,575.
Bleil, Carl E., 3,729,818.
Buchanan, Harry Charles, Jr., 3,729,766.
Buchwald, Robert M., 3,730,147.
Cwycyshyn, Walter; and Kitchen, Elwyn L., Jr., 3,730,004.
Dick, Melvin E., 3,730,462.
Elam, Charles F., 3,730,493.
Elam, Charles F., 3,730,495.
Felix, Gerardus L.; and Bennett, Frank C., 3,730,596.
Gute, Loren R., 3,730,217.
Haddad, Mitchell J., 3,729,937.
Heck, Burnette; and Reynolds, Donald W., 3,730,301.
Mollica, Richard J., Jr.; Hunter, Joseph E., Jr.; and Bladzik, Kenneth R., 3,729,805.
Moulds, John W.; and Storey, Edwin C., 3,730,146.
O'Malley, John J., 3,730,022.
Parkinson, Charles F., 3,730,581.
Prisk, Bert C.; Erickson, Raymond Kenneth; and Wheatley, Marion E., 3,730,812.
Smith, Claude A.; and Williams, Donald L., 3,730,151.
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Webbere, Fred J.; and Williams, Robert G., 3,730,251.

General Signal Corporation: *See—*
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Smith, Willis R., 3,731,086.

General Time Corporation: *See—*
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General Tire & Rubber Company, The: *See—*
Uelzmann, Heinz; and Hidinger, David C., Jr., 3,730,945.

Gerber Garment Technology, Inc.: *See—*
Gerber, Heinz Joseph; and Pearl, David R., 3,730,634.

Gerber, Heinz Joseph; and Pearl, David R., to Gerber Garment Technology, Inc. Apparatus for cutting and drilling sheet material. 3,730,634, Cl. 408-22.000.

Gerhold, Clarence G., to Universal Oil Products Company. Carburetor control system and method for regulating air to fuel ratio. 3,730,157, Cl. 123-119.00r.

Gerlach, Gottfried: *See—*
Lailach, Gunter; Gerlach, Gottfried; Trenczek, Gerhard; and Brandle, Karl, 3,730,748.

Gerlach, John R., to Emhart Corporation. Single engagement permanently secured keyless lock. 3,730,578, Cl. 292-318.000.

Gerst, Carl W.; Hair, Hugh A.; Hiller, Robert G.; Simpson, Charles G.; and Worden, Robert A., to Research Corporation. Quasi-optical signal processing utilizing hybrid matrices. 3,731,217, Cl. 330-56.000.

Gerzon, Koert, to Lilly, Eli, and Company. 4-Adamontylamino quinolines. 3,730,956, Cl. 260-285.00r.

Gesellschaft fur Kernforschung m.b.H.: *See—*
Schwind, Eduard; and Schlosser, Peter, 3,730,851.

Gevaert-Agfa N.V.: *See—*
Delzenne, Gerard Albert, 3,730,734.

Ghosh, Hitendra N., to International Business Machines Corporation. Performance matched complementary pair transistors. 3,730,786, Cl. 148-175.000.

Giampalmi, John J., Jr.; and Oldford, William G., to Dow Chemical Company, The. Dry cleaning solvent filter. 3,730,347, Cl. 210-266.000.

Gibbs, Paul H., Sr. Hose-case assembly. 3,730,228, Cl. 138-106.000.

Gibson, James W.; Videtto, Donald A.; and Linse, Richard C., to General Electric Company. Barrel forming press. 3,729,969, Cl. 72-127.000.

Giglio, Gino. Lavatory sink construction. 3,729,750, Cl. 4-187.000.

Gilbert, Harold James; and Dixon, Reginald John, to Wickman Machine Tool Sales Limited. Automatic lathes. 3,730,030, Cl. 82-21.00r.

Gilbert, Lloyd O.; and Finney, John S. Method for inhibiting staining of electrodeposited coatings formed in a cyanide containing bath. 3,730,192, Cl. 134-2.000.

Gilham, (, Peter Thomas; and Weith, Herbert Lee, to Purdue Research Foundation. Polynucleotide analysis. 3,730,844, Cl. 195-103.50r.

Gilman, Paul: *See—*
Williams, John; and Gilman, Paul, 3,730,721.

Gilman, Paul Brewster, Jr.; Raleigh, Ronald George; and Koszelak, Thaddeus Donald, to Eastman Kodak Company. Direct positive processes utilizing silver halide surface image emulsions containing desensitizers. 3,730,723, Cl. 96-64.000.

Giordano, Frank L., to Insect-O-Cutor, Inc. Insect electrocutor. 3,729,857, Cl. 43-112.000.

Giovannetti, Fiorello. Connector. 3,730,568, Cl. 287-20.927.

Girling Limited: *See—*
Rath, Heinrich Bernhard, 3,730,306.

Gisler, Philip S.: *See—*
Frost, Charles B.; and Gisler, Philip S., 3,730,792.

Gjldenpfennig, Rolf, to Reichhold-Albert-Chemie Aktiengesellschaft. Epoxy resin ester based water-soluble or water-dilutable coating compositions. 3,730,926, Cl. 260-18.0ep.

Glander, Fritz: *See—*
Weichardt, Helmut; Glander, Fritz; Ziemek, Gerhard; Schuppe, Walter; Meyer, Hans; and Eilhardt, Bernd, 3,729,919.

Glass Laboratories Company: *See—*
Shanok, Victor; and Shanok, Jesse P., 3,730,577.

Glass, Marvin, and Associates: *See—*
Disko, Harry, 3,729,881.

Glaverbel S.A.: *See—*
Boffe, Maurice, 3,730,871.

Glaze, Cecil K.: *See—*
Prewitt, Cecil H., 3,730,346.

Gleim, William K. T.; Gatsis, John G.; and O'Hara, Mark J., to Universal Oil Products Company. Combination process for black oil conversion. 3,730,875, Cl. 208-57.000.

Globus, Alfred R., to Farah Manufacturing Co., Inc. and Guardian Chemical Corporation. Low calorie sweetener. 3,730,736, Cl. 99-141.00a.

Goda, George G. Liquid dispnsing apparatus. 3,730,398, Cl. 222-309.000.

Goeckel, Helmut, to Neckermann Versand KGaA. Sound source cabinets. 3,730,291, Cl. 181-31.00b.

Goff, Richard E.; and Schiappa, Antonio, to Johnson & Johnson. Loom take up motion. 3,730,233, Cl. 139-309.000.

Golbinshtein, Alexandr Isovich: *See—*
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Tkach, Khaim Berkovich; Nazarov, Nikolai Grigorievich; Malbert, Petr Eduardovich; Lavron, Nikolai Sergeevich; Alkasarov, Jury Innokentievich; Legeche, Nikolai Leontievich; Golbinshtein, Alexanr Isovich; Reinsburg, Alexandr Mironovich; Burshtein, Mikhail Vladimirovich; Mikushin, Dmitry Pavlovich; Terskov, Alexei Danilovich; and Belov, Leonid Stepanovich, 3,730,283.

Goldberg, Harold D.; and Goldberg, Milton I. Deformable pick up coil and cooperating magnet for measuring physical quantities, with means for rendering coil output independent facilitate process. 3,731,184, Cl. 324-34.00r.

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Goldberg, Nathaniel D., to Fenco, Inc. Conveyor device. 3,730,331, Cl. 198-189.000.

Goldin, Morris; and Jacobson, Gerson M., to Hughes Tool Co. Variable volume firing chamber. 3,730,050, Cl. 89-14.00r.

Goldschmidt, Th., AG: *See—*
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Goldsmith, Henry John; and Kirk, Frank, to Whiteley Lang and Neill Limited. Peritoneal dialysis apparatus. 3,730,183, Cl. 128-213.000.

Gonzalez, Allen C. Folding leg and bracket. 3,730,465, Cl. 248-188.600.

Goode, John V.: *See—*
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Freeder, Herman; and Wilt, Homer E., 3,730,320.
Sidles, James; Skala, Dennis P.; and Skolnik, Leonard, 3,730,246.

Goodrich, Robert S. Latching telephone cut-off switch. 3,731,010, Cl. 179-167.000.

Goodwin, Raymond W.; and Alimena, James J., to United Aircraft Corporation. Optical shaft encoder. 3,731,107, Cl. 250-231.0se.

Goodwin, Richard Rohland. Automatic working liquid sampler for providing liquid samples for spectrographic wear analysis. 3,730,001, Cl. 73-422.00r.

Goodwin, Robert C., to Anchor Hocking Corporation. Apparatus for ejecting misaligned articles. 3,730,325, Cl. 198-33.00r.

Goodyear Tire & Rubber Company, The: *See—*
Bricker, Carl E.; and Hillegass, Kenneth P., 3,730,303.
Brinkley, Max D.; and Kerr, Glenn D., 3,730,510.

Lovell, John A.; and Harris, Philip G., 3,730,822.
Marra, Theodore F., 3,730,658.
Meyers, Dale J., 3,731,202.

Goodyear Tire and Rubber Company, The: *See—*
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Gordon, Donald L., to Flint & Walling, Inc. Centrifugal pumps. 3,730,641, Cl. 415-199.00a.

Gordon, Sherrit, Mines Limited: *See—*
Kunda, Wasyl; and Randell, Donald Alan, 3,730,756.

Gordon, Travis Hill; Marino, Patrick John; and Pilc, Randolph John, to Bell Telephone Laboratories, Incorporated. Recirculating store circuit for time-division switch processor. 3,731,281, Cl. 340-172.00s.

Goss Gas, Inc.: *See—*
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Goss, Herbert C., to Goss Gas, Inc. Method of making welding tip for cutting torch. 3,729,792, Cl. 29-157.00c.

Goto, Hisao: *See—*
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Goto, Tsugio; and Tamura, Tsutomu, to Asahi Kasei Kogyo Kabushiki Kaisha. Apparatus for detecting yarn quality information. 3,731,069, Cl. 235-151.300.

Gott, Hans: *See—*
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Graalmann, Gerhard; and Wellach, Dieter, to Hauni-Werke Korber & Co. K.G. Analog signal delay arrangement. 3,731,286, Cl. 340-173.0rc.

Graber, Carl W., to Royal Brass Manufacturing Company, The. Flow volume regulating valve. 3,730,773, Cl. 138-46.000.

Grabmaier, Josef; Krueger, Hans; and Wolff, Ulrich, to Siemens Aktiengesellschaft. Indicator screen with controlled voltage to matrix crosspoints thereof. 3,730,607, Cl. 350-160.0lc.

Grace, W. R., & Co.: *See—*
Albers, Edwin W.; and Edwards, Grant C., 3,730,910.
Braude, Geroge L., 3,730,951.
Ketley, Arthur Donald; Kehr, Clifton Leroy; and Touchette, Jennie Lee, 3,730,715.
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Ross, William Campbell, 3,730,244.
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Grady, Guido O.; Swalley, Everett L.; and Swift, Sam C., to Cities Service Oil Company. Apparatus for determining visual phase equilibria data. 3,729,981, Cl. 73-17.00a.

Graf, Robert E.: *See—*
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Graifer, Valery Isaakovich: *See—*
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Gran, Torleif. Apparatus for heating water by means of an oilburner. 3,730,166, Cl. 126-350.00r.

Grass, Gunther: *See—*
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Graves, James G. Two-cycle internal combustion engine. 3,729,927, Cl. 60-39.600.

Gravoki Systems Limited: *See—*
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Gray, James H.; and Rood, William E., Jr., to Garland Steel Company. Cotton stripping means. 3,729,909, Cl. 56-34.000.

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Green, Laurence. Guiding light system for trailer tow car hook-up. 3,731,274, Cl. 340-52.00r.

Green, Martin. Multi-game system. 3,730,524, Cl. 273-85.00r.

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Greenblatt, David; and Greenblatt, Allan. Soft-soled footwear. 3,729,843, Cl. 36-4.000.

Greene, Michael L.; and Waugh, Theodore R., to United States of America, Navy. Programmed cord cutter. 3,730,045, Cl. 83-580.000.

Greene, Norman D. Black body thermoelectric radiometer. 3,731,099, Cl. 250-83.30h.

Gregory, Gerrett W., to Rohr Industries, Inc. Nutplate riveting device and method. 3,729,801, Cl. 29-243.530.

Greutman, Weldon Wayne; and Studebaker, Isaac Roger, to International Telephone and Telegraph Corporation. Digital to sin/COS converter. 3,731,300, Cl. 340-347.0da.

Grieb, Hubert: *See—*
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Griffis, Juniper, 49% to Lyst, Harold E. Truck or trailer with laterally tiltable dump body with hinged side panels hydraulically operated from closed to open position. 3,730,591, Cl. 298-17.600.

Groenveld, Pieter, to Cominco Ltd. Process for the production of ammonium phosphate fertilizers. 3,730,700, Cl. 71-34.000.

Gross, Bette L. Candle. 3,730,674, Cl. 431-288.000.

Grosseau, Albert, to Societe Anonyme Automobiles. Tool for electrolytically honing spherical surfaces. 3,730,870, Cl. 204-224.000.

Groswith, Charles T., III: *See—*
Abildgaard, William H.; and Groswith, Charles T., III, 3,730,560.

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Guell, Jose Maria Dalmau. Machine for cutting teeth on selector combs for drums and others for knitting machines. 3,730,412, Cl. 225-103.000.

Gueussier, Andre; Tricot, Roland; and Lacoude, Michel, to Ugine Aciers. Apparatus for treatment of metal products. 3,730,501, Cl. 266-4.00a.

Guimbellot, Bobby E. Fusible safety device. 3,730,205, Cl. 137-73.000.

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Gurganus, Thomas B.; Turnbull, Gordon K.; and Montgomery, Allen M., to Aluminum Company of America. Method of hot compacting titanium powder. 3,729,971, Cl. 72-226.000.

Gurkin, David E. Burnishing device for rotary television set tuners' contacts. 3,729,768, Cl. 15-256.510.

Gurkov, Konstantin Stepanovich: *See—*
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Tkach, Khaim Berkovich; Nazarov, Nikolai Grigorievich; Malbert, Petr Eduardovich; Lavron, Nikolai Sergeevich; Alkasarov, Jury Innokentievich; Legeche, Nikolai Leontievich; Golbinshtein, Alexanr Isovich; Reinsburg, Alexandr Mironovich; Burshtein, Mikhail Vladimirovich; Mikushin, Dmitry Pavlovich; Terskov, Alexei Danilovich; and Belov, Leonid Stepanovich, 3,730,283.

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Gutzeitin, O. Y., Laatikkotehdas-A.B. Gurzeits Ladfabrik: *See—*
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Haas, John I., Inc.: *See—*
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Haberkorn, Erich J., to Messerschmitt-Bolkow-Blohm GmbH. Jet-controlled aircraft with trim and control fins. 3,730,458, Cl. 244-43.000.

Haberrecker, Klaus, to Siemens Aktiengesellschaft. X-ray tube with rotary anodes. 3,731,128, Cl. 313-60.000.

Haddad, Mitchell J., to General Motors Corporation. Engine exhaust reactor and method of making. 3,729,937, Cl. 60-298.000.

Hadfield, Harry J., to United States of America, Army. Mechanical anti-disturbance device. 3,730,100, Cl. 102-70.00s.

Hafer, Paul M., to Arrow-Hart, Inc. Plug-in bus duct. 3,731,256, Cl. 339-22.00b.
Hafner, Theodore. Vehicular communications systems. 3,731,314, Cl. 343-717.000.
Hagenbach, Robert J.; and Lenhard, Myron J., to Xerox Corporation. Method of developing latent images. 3,730,707, Cl. 96-1.0sd.
Hagenlocher, Walter; and Binder, Georg, to Bosch, Robert, G.m.b.H. Electrical machine with shielded circuit parts. 3,731,126, Cl. 310-68.000.
Haggerty, William Andrew, to Cincinnati Milling Machine Co., The. Method of electrochemical machining. 3,730,861, Cl. 204-129.750.
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Hall, Raymond L. Folding truss. 3,729,877, Cl. 52-109.000.
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Hanson, Walter J., to Pitney-Bowes, Inc. Value dispensing mechanisms. 3,731,068, Cl. 235-101.000.
Hanzlik, William M. Screw-supporting attachment for the shank of a screw driver tool. 3,730,237, Cl. 145-52.000.
Hardee, Eldred V. Hydraulically operated offset cutter. 3,729,910, Cl. 56-11.900.
Hardin, George T., to Robertshaw Controls Company. Time schedule controller and parts and system therefor. 3,730,427, Cl. 236-46.000.
Hardway, Edward V., Jr., to Spearhead, Inc. Capacitive displacement transducer. 3,729,991, Cl. 73-136.00a.
Hare, Lloyd E., to Litton Business Systems, Inc. Changeable type heads and changeable key caps. 3,730,322, Cl. 197-36.000.
Hare, Paul N., to Cities Service Company. Pelletizer. 3,730,663, Cl. 425-222.000.
Harlin, Paul L. Cam generating device. 3,730,052, Cl. 90-20.000.
Harman, John W. Front fork assembly for two wheel vehicles. 3,730,553, Cl. 280-277.000.
Harms, Wolf-Henning, to Krone GmbH. Voltage detector for sensing and digitally encoding states of potential. 3,731,118, Cl. 307-255.000.
Harper, William H.; Peace, Charles R.; and Keller, Jake B., to A.M.H. Equipment, Inc. Mobile particulate material carrier and dispenser. 3,730,396, Cl. 222-166.000.
Harrington, Dean B., to General Electric Company. Generator end tooth flux shield. 3,731,127, Cl. 310-254.000.
Harrington, Richard P.; and Harrington, Russell J. Combination lock. 3,729,962, Cl. 70-25.000.
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Harris, Clarence P. Grinding apparatus. 3,730,442, Cl. 241-60.000.
Harris, Darel E. Shower chair. 3,730,590, Cl. 297-445.000.
Harris, John L. Condition control device and system. 3,731,174, Cl. 318-485.000.
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Harvey, James R., to Union Carbide Corporation. Amine curing agents for polyepoxide composition. 3,730,908, Cl. 252-426.000.
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Heck, Burnette; and Reynolds, Donald W., to General Motors Corporation. Temperature responsive pump drive mechanism. 3,730,301, Cl. 188-71.600.
Heffington, Thomas E. Mobile refuse retriever. 3,730,367, Cl. 214-518.000.
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Heisler, Raymond A. Plastic pail with integral handle and plug-type plastic cover. 3,730,382, Cl. 220-60.00r.
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Hekimian, Norris C., to Hekimian Laboratories, Inc. Phantastron circuit employing operational amplifier. 3,731,232, Cl. 332-31.00r.
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Heller, William C., Jr.; and Shatzkin, Leonard, said Shatzkin assor. to said Heller, William C., Jr. Method of joining book leaves. 3,730,805, Cl. 156-272.000.
Heller, William C., Jr.; and Shatzkin, Leonard, said Shatzkin assor. to said Heller, William C., Jr. Book binding process. 3,730,806, Cl. 156-272.000.
Helms, Jack A., to Seahorse Spars and Equipment, Ltd. Extruded cam cleat. 3,730,129, Cl. 114-218.000.
Helwig, Frederick Charles, to Construction Specialties, Inc. Grille. 3,730,074, Cl. 98-121.000.
Hendriks, Adrianus Antonius Maria, to U.S. Philips Corporation. Gas discharge tube having a number of juxtaposed matrix groups for displaying characters. 3,731,132, Cl. 313-109.500.
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Herpich, William A.; Palmer, George W.; and Bartholomew, Ray E., to Peabody Galion Corporation. Apparatus for dumping heavy containers. 3,730,365, Cl. 214-302.000.

Herr, Charles H.; and McIntosh, Alexander C., to Caterpillar Tractor Co. Transmission output clutch with conditional overrunning capability. 3,730,314, Cl. 192-18.00a.

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Hess, Morris. Drapery installations. 3,730,249, Cl. 160-126.000.

Hesselmann, Patrick George, to Honeywell Information Systems Inc. Terminal pin straightening machine. 3,730,234, Cl. 140-147.000.

Hesskamp, Robert G., to MR Plastics and Coatings, Inc., mesne. Self-extinguishing polyurethane foam composite and binder composition therefor. 3,730,917, Cl. 260-2.5ak.

Heurtebise, Byron T. Omni-directional force sensor. 3,731,019, Cl. 200-61.45r.

Hewlett-Packard Company: *See—*
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Heyman, Karl: *See—*
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Hicks, Harris Vernon. Road vehicle lighting systems. 3,731,141, Cl. 315-83.000.

Hidinger, David C., Jr.: *See—*
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High Voltage Power Corporation: *See—*
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Higuchi, Takeru, to ALZA Corporation. Process for storing blood platelets. 3,729,947, Cl. 62-60.000.

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Hines, John Grahame; and Cotton, Joseph Bernard, to Imperial Chemical Industries Limited. Electrolytic preparation of valve group metal equipment for use in chemical plants. 3,730,856, Cl. 204-56.00r.

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Sugimoto, Kaname; Hirao, Mamoru; Yoshida, Mikihiko; Shiosaka, Makoto; and Yokobayashi, Yasuyuki, 3,730,840.

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Hirono, Akira; and Miyajima, Masayoshi, to Blackwell Electronics Ind. Co., Ltd. Phase control type dimming system with means to compensate for the hysteresis effect. 3,731,182, Cl. 323-19.000.

Hitachi Chemical Company, Ltd.: *See—*
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Hjerpe, Curt, to Facit AB, mesne. Printing mechanism. 3,730,083, Cl. 101-93.0mn.

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Hoffman, Manfred T.; and Healy, Lawrence W., to Wellman Inc. System for opening crimped multifilament bands. 3,729,777, Cl. 19-65.00t.

Hofman, Wytze, to U.S. Philips Corporation. Method of forming plural strip-shaped magnetic poles. 3,731,242, Cl. 335-284.000.

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Hollett, Ronald G.: *See—*
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Holley Engineering Co., Inc.: *See—*
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Holley, George M., Jr. Direct current servo mechanism. 3,731,171, Cl. 318-396.000.

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Holowaty, Michael O.; and Knoerzer, Jerome J., to Inland Steel Company. Method for reducing dust during handling of reactive form coke briquettes. 3,730,692, Cl. 44-6.000.

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Horres, Charles Russell, Jr.; and Leonard, Richard L., to United States of America, Interior. Fabrication of high pressure seals for water equailibrated faber bundles. 3,730,959, Cl. 264-263.000.

Horton, Frank E.; Morris, Thomas M.; and Christman, Frank E., to Inspiration Consolidated Copper Company. Electrolytic recovery of copper from oxidizable cupriferous material. 3,730,860, Cl. 204-108.000.

Hotchkiss, Stuart E.; Smith, Bruce H.; and Stefko, Paul L., Jr., to Xerox Corporation. Early end of tape detection. 3,730,453, Cl. 242-191.000.

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Hubbell, Harvey, Incorporated: *See—*
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Hughes Tool Company: *See—*
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Huigens, Wilfred J., to Lisle Corporation. Interlock safety device for machinery. 3,730,296, Cl. 192-134.000.

Hultgren, Eric Alex, to Eyelet Specialty Company. Mold apparatus for making a closure cap. 3,730,664, Cl. 425-338.000.

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Hunt, Robert P., to Spectrotherm Corporation. Image scanner drive system. 3,731,098, Cl. 250-83.30h.

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Hutchinson, Bruce R.; Hunter, Bruce H.; and Brooks, Robert N., to Silent Glow Corporation. Incineration systems and methods. 3,730,112, Cl. 110-8.00r.

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Iadicicco, Robert A.; and Wolfe, Paul G., to Philco-Ford Corporation. Graded field cathode ray tube. 3,731,135, Cl. 315-31.00r.

Ichinohe, Eisuke: *See—*
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Iguchi, Takashi; Hayakawa, Shiro; and Ohosawa, Hiroshi, to Asahi Kasei Kogyo Kabushiki Kaisha. Process for producing yeast with increased methionine content. 3,730,837, Cl. 195-28.00r.

Ihochi, Takahiko; and Yamada, Tomio, to Hitachi, Ltd. Method for manufacturing a package of a semiconductor element. 3,729,820, Cl. 29-627.000.

Iida, Hirofumi; and Watanabe, Kazufumi, to Tokyo Gas Company Limited. Combustion method of gas burners for suppressing the formation of nitrogen oxides and burner apparatus for practicing said method. 3,730,668, Cl. 431-10.000.

Iida, Teiji, to Hitachi, Ltd. and Teiji Iida. Color picture tube utilizing a shadow mask which selects colors and detects the displacement of the beam. 3,731,134, Cl. 315-21.00c.

Ikegaki, Makoto: *See—*
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Improved Machinery Inc.: *See—*
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Industrial Construction Co., Inc.: *See—*
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Inoue, Isaburo; Endo, Takaya; Matsuo, Syunji; Taguchi, Masahiko; and Yamamoto, Toshihiko, to Konishiroku Photo Industry Co. Ltd. Yellow coupler and its use. 3,730,722, Cl. 96-56.300.

Inoue, Morio: *See—*
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Insect-O-Cutor, Inc.: *See—*
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Inuzuka, Isao; Watanabe, Kikuo; Yuminaka, Takeo; Iwasaka, Tatsuo; and Ochi, Toshio, to Hitachi, Ltd. Elevator control system. 3,730,299, Cl. 187-29.00r.

Inuzuka, Isao; Watanabe, Akinori; and Oohira, Takeshi, to Hitachi, Ltd. Duplex driving system for an electrically-operated moving object with an endless chain. 3,731,166, Cl. 318-35.000.

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Isomura, Takuji, to Nippondenso Co., Ltd. RPM regulator for internal combustion engines, particulary engines for aggregates. 3,730,003, Cl. 73-541.000.

Isquith, Alan J.; Abbott, Eugene A.; and Walters, Patrick A., to Dow Corning Corporation. Method for controlling the growth of algae in an aqueous medium. 3,730,701, Cl. 71-67.000.

Itek Corporation: *See—*
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Iwasaki, Norio: *See—*
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Izzo, Charles P. Tennis score computer. 3,730,131, Cl. 116-120.000.

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Jackson, David B., to Hercules Incorporated. Interconnected network structure. 3,730,821, Cl. 161-57.000.

Jackson, Dennis Hurshal. Emission and pollutant recovery process and apparatus. 3,729,901, Cl. 55-244.000.

Jackson, Earl V., to Xerox Corporation. Focusing method. 3,730,620, Cl. 355-8.000.

Jackson, Norman: *See—*
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Jaffe, Edward E., to Du Pont de Nemours, E. I., and Company. Dianthrapyrimidine yellow. 3,730,955, Cl. 260-256.40q.

Janke, Donald E.; and Marcade, Roque D., to Whirlpool Corporation. Dryness sensor circuit with static eliminating means for dryer. 3,729,833, Cl. 34-48.000.

Jarvis, George A.; and Danley, Allen M., to Litton Systems, Inc. Microwave oven door. 3,731,035, Cl. 219-10.550.

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Jenkins, Donald S., to North American Rockwell Corporation. Fluorine oxidizer gas generator. 3,730,788, Cl. 149-1.000.

Jensen, Olav N., to Gutzeitin, O. Y., Laatikkotehdas-A.B. Gurzeits Ladfabrik. Method for manufacturing building boards with chequer-square pattern. 3,730,797, Cl. 156-182.000.

Jet Spray Cooler, Inc.: *See—*
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JFD Electronics Corporation: *See—*
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J.M.R. Enterprises, Inc.: *See—*
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Joel, Amos Edward, Jr., to Bell Telephone Laboratories, Incorporated. Equipment for switching calls from remote trunk groups to distant centralized operator service center. 3,731,000, Cl. 179-8.00r.

Johns, Herman S., to Wellman Industries, Inc. Sliver can donning and doffing apparatus for coilers. 3,729,776, Cl. 19-159.00a.

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Johnsen, Bernadou W., II: *See—*
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Johnson & Johnson: *See—*
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Mesek, Frederick K., 3,730,184.

Johnson, Arthur C.; and Herrman, Robert F., to Inductherm Corporation. Power control and phase angle correcting apparatus. 3,731,183, Cl. 323-24.000.

Johnson, Byron L., to High Voltage Power Corporation. Transposition of insulating core windings. 3,731,244, Cl. 336-187.000.

Johnson, Cameron D.; Mayer, Gerald M.; and Morency, Roger L., to United States of America, Navy. Hydrodynamic shock simulator. 3,729,980, Cl. 73-12.000.

Johnson, Clarence R.; and Kidder, Jay T. Bed and lounge unit. 3,729,753, Cl. 5-2.00r.

Johnson, Leonard A., to Minnesota Mining & Manufacturing Company. Terminal with grease retaining members. 3,730,970, Cl. 174-73.00r.

Johnson, Peter Graham: *See—*
Clementson, John Joseph; and Johnson, Peter Graham, 3,730,904.

Johnson, S. C., & Son: *See—*
Klema, Kenneth G., 3,730,400.

Johnson, Wallace J. S., to Up-Right, Inc. Field crusher for grapes. 3,730,443, Cl. 241-82.100.

Johnston, James Stewart, to Rosemount Engineering Company, Limited. Signal processing circuits. 3,731,072, Cl. 235-151.300.

Johnston, Thomas W.; and Pippin, Jack M., to Unlimited Development, Inc. Collapsible crutch. 3,730,198, Cl. 135-50.000.

Johnston, Wilbur Dexter, Jr., to Bell Telephone Laboratories, Incorporated. Laser apparatus for optical modulation transfer. 3,731,223, Cl. 331-94.500.

Jonakin, James, to Combustion Engineering, Inc. Damper-rod scrubber. 3,730,499, Cl. 261-109.000.

Jones, Edward M. T.; and Tanner, Robert L., to Technology for Communications International. Balun transformer with a single magnetic core and impedance transforming means. 3,731,238, Cl. 333-26.000.

Jones, John R.: *See—*
Bilow, Norman; and Jones, John R., 3,730,893.

Jones, Kenneth G.: *See—*
Lucas, William H.; and Jones, Kenneth G., 3,729,886.

Jones, Lawrence T.: *See—*
Smith, Jay, III; Schmidt, Gerald W.; and Jones, Lawrence T., 3,729,859.

Jordan, William E., to Xerox Corporation. Vacuum holddown device for moving belts. 3,730,623, Cl. 355-16.000.

Jorn, Raoul. Composite spring element for use as a motor mount. 3,730,509, Cl. 267-152.000.

Jubb, Albert, to Rolls-Royce Limited. Gas turbine engine. 3,730,644, Cl. 416-95.000.

Judson, Roger D.; and Sherwood, John W. C., to Chevron Research Company. Static corrections for seismic traces by cross-correlation method. 3,731,269, Cl. 340-15.5cc.

Jugle, Don B., to Xerox Corporation. Electrophotographic multi-color process employing liquid developer. 3,730,708, Cl. 96-1.200.

Jungblut, Camille. Thermostable and thermoplastic linear polythioethers. 3,730,949, Cl. 260-47.00r.

Juy, Lucien Charles H. Speed-change mechanism for a bicycle. 3,730,012, Cl. 74-242.000.
Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft: *See*—
Weichardt, Helmut; Glander, Fritz; Ziemek, Gerhard; Schuppe, Walter; Meyer, Hans; and Eilhardt, Bernd, 3,729,919.
Kabushiki Kaisha Daini Keikosha: *See*—
Aoki, Masayoshi, 3,729,924.
Kabushiki Kaisha Machida Seisakusho: *See*—
Chikama, Toshio, 3,730,632.
Kabushiki Kaisha Ricoh: *See*—
Fujimoto, Sakae, 3,730,619.
Ohta, Wasaburo, 3,730,710.
Kadi, Frank G. Pneumatic wafer spinner and control for same. 3,730,134, Cl. 118-6.000.
Kaessen, Donald A.: *See*—
Conery, William J.; and Kaessen, Donald A., 3,730,215.
Kahrs, James W.; and Osborn, Paul E., to Mor-Fish-Ent, Inc. Fish self-feeder. 3,730,142, Cl. 119-54.000.
Kaiser, Leonnard: *See*—
Schmidt, Gunther; Theiss, Armin; Dederra, Carl-Helmut; and Kaiser, Leonnard, 3,729,793.
Kakimoto, Toshio: *See*—
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Kalgio Electronic Co., Inc.: *See*—
Kerchner, Charles F., Jr.; and Ball, David A., 3,731,055.
Kalkhof, Gustav: *See*—
Pfeuffer, Alfred; Kalkhof, Gustav; Weber, Helmut; and Ludtke, Arnold, 3,730,780.
Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, to L'Oreal. Dyeing keratinous fibers with a quinoneimine and a coupler. 3,730,677, Cl. 8-10.200.
Kaman, Frank A.; and McConnaughay, Harold, to Skil Corporation. Circular saw with improved movable guard construction. 3,730,239, Cl. 143-159.00h.
Kapalko, Erwin J.; and English, William H., to PPG Industries, Inc. Electrodeposition of a composition containing an ester resin and a methylophenol ether. 3,730,865, Cl. 204-181.000.
Kaplan, Burton. Method and apparatus for instruction of stringed instrument bow positioning. 3,730,964, Cl. 84-470.000.
Karelin, Nikolai Ivanovich: *See*—
Daiker, Artur Lvovich; Morozov, Alexandr Nikolaevich; Veis, Anatoly Ivanovich; Kushtuev, Boris Grigorievich; Novoselov, Nikolai Mikhailovich; Zhuravlev, Viktor Nikolaevich; Zinoviev, Alexei Fedorovich; Alfeev, Ivan Ivanovich; Nikitin, Viktor Ivanovich; Kocergin, Alexei Ilich; Matashkov, Vladimir Filippovich; Karelin, Nikolai Ivanovich; Volchematiev, Jury Venediktovich; Zaluzhentsev, Veniamin Fedorovich; and Morozov, Gennady Yakovlevich, 3,730,504.
Kargul, Aloysius S. Centrifugally expansible hula hoop. 3,729,860, Cl. 46-47.000.
Karlovsky, Jerry, Jr., to National Mine Service Company. Continuous mining machine. 3,730,593, Cl. 299-76.000.
Karpf, Josef, to Steffens, G. W. Cutting head for comminuting machines. 3,730,363, Cl. 241-282.100.
Kase, Hiroaki: *See*—
Masuda, Noboru; Kuroyanagi, Masahi; and Kase, Hiroaki, 3,731,007.
Kasper, Robert Jerry, to Park-Ohio Industries, Inc. Billet heating coil. 3,731,040, Cl. 219-10.790.
Katano, Takeshi: *See*—
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Oba, Yoichi; Kato, Hachioji; Tsunoda, Tokorozawa Teruo; Fujiki, Yokyo Shun; and Tsukuni, Hitachi Hajime, 3,730,913.
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Katsuragawa Denki Kabushiki Kaisha: *See*—
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Katzer, Melvin F.; and Routson, Willis G., to Dow Chemical Company, The. Reducing pressure on liquids. 3,730,203, Cl. 137-14.000.
Kaufman, Raymond H., to United States of America, Army. Bipolar servo amplifier commutation circuit using a separate silicon controlled rectifier and isolated power supply for charging a commutation capacitor. 3,731,172, Cl. 318-439.000.
Kawanishi, Zenzaburo: *See*—
Oka, Toshio; and Kawanishi, Zenzaburo, 3,730,530.
Kawasaki, Kentaro; Ono, Takyuki; and Takizawa, Keizo, to Chori Company, Ltd. Bulky yarn and method of producing the same. 3,729,918, Cl. 57-140.0by.
Kawase, Yutaka: *See*—
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Kawazoe, Shiro: *See*—
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Kay, Robert De Witt. Apparatus for cleaning paint roller covers. 3,730,195, Cl. 134-138.000.
Kazmierski, John, Jr.; Lawson, Benjamin, Jr.; Thornton, Craig Edward; and Verrelli, Gerard Louis, Jr., to Johns-Manville Corporation. Duct connector. 3,730,566, Cl. 285-229.000.
Keeler, Jack D.: *See*—
Sherman, Lawrence V.; Marson, Richard A.; Keeler, Jack D.; and Fagan, Edmund I., 3,731,149.
Keene, Derek K.; and Miller, Edward W., to Eaton Corporation. Thrust imparting joint connection. 3,730,369, Cl. 214-674.000.
Keenon, Timothy R., to Ford Motor Company. Control means for carburetor automatic choke. 3,730,498, Cl. 261-39.00b.
Kehr, Clifton Leroy: *See*—
Ketley, Arthur Donald; Kehr, Clifton Leroy; and Touchette, Jennie Lee, 3,730,715.
Keller, Anthony T. Pivot limiting assembly. 3,730,555, Cl. 280-432.000.
Keller, Franz: *See*—
Buhrer, Erwin; and Keller, Franz, 3,730,253.
Keller, Hans, to ITT Industries, Inc. Circuit arrangement for maintaining the oscillations of an electro-mechanical oscillator. 3,731,229, Cl. 331-116.00m.
Keller, Jake B.: *See*—
Harper, William H.; Peace, Charles R.; and Keller, Jake B., 3,730,396.
Keller, Kalus. Method of treating workpieces in a glow discharge. 3,730,863, Cl. 204-164.000.
Kelley, Carl S.; and Thorn, Frank H., to Phillips Petroleum Company. Separation of gases. 3,729,944, Cl. 62-39.000.
Kelley, Jerry O., to Arvin Industries, Inc. Finger between flexible disc and backing plate. 3,731,292, Cl. 340-174.10e.
Kelly, Larry A. Sheet metal bracket. 3,730,464, Cl. 248-57.000.
Kendall Company, The: *See*—
Binard, William J.; and Dye, John F., 3,730,209.
Chesky, Sheldon R., 3,730,338.
McWhorter, Daniel M., 3,730,168.
Kennedy, William S., to Aerotherm Corporation. Photometric detector and measuring system. 3,730,633, Cl. 356-156.000.
Kent, Robert L., to Damon Corporation. Signal processor. 3,730,627, Cl. 356-205.000.
Kerchner, Charles F., Jr.; and Ball, David A., to Kalglo Electronic Co., Inc. Radiant heating apparatus. 3,731,055, Cl. 219-349.000.
Kerr, Glenn D.: *See*—
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Kerr, John Anthony: *See*—
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Shannon, John Martin; and Kerr, John Anthony, 3,730,778.
Kerr, William C., to Eastman Kodak Company. Method for treating a web. 3,730,753, Cl. 117-34.000.
Kerstetter, Donald R.: *See*—
Buescher, William E.; and Kerstetter, Donald R., 3,730,706.
Kesling, Peter C. Lock ring for edgewise bracket. 3,729,826, Cl. 32-14.00a.
Ketley, Arthur Donald; Kehr, Clifton Leroy; and Touchette, Jennie Lee, to Grace, W. R., & Co. Process for forming silverless continuous tone photographic image with polythiol polymers. 3,730,715, Cl. 96-35.100.
Kettins, Angus: *See*—
Stewart, David Bruce; Newtyle, Angus; Main, John; Kettins, Angus; and Duncan, Maurice, 3,730,802.
Key, Edward H., to Thomas & Betts Corporation. Jumper for interconnecting dual-in-line sockets. 3,731,254, Cl. 339-17.0cf.
Keyes, Mark C.: *See*—
Patashnik, Max; and Keyes, Mark C., 3,730,728.
Khoury, Henri A.; and Rottmann, Hans R., to International Business Machines Corporation. Apparatus for contouring the surface of thin elements. 3,729,966, Cl. 72-12.000.
Kidd, Earl H.: *See*—
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Kidder, Jay T.: *See*—
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Kindell, Jerry L.; and Trubisky, Leonard G., to Honeywell Information Systems Inc. Binary two's complement multiplier processing two multiplier bits per cycle. 3,730,425, Cl. 235-164.000.
King, John L., Jr.; and Koch, Roland G., to Houdaille Industries, Inc. Tool holder with spring operated nut. 3,730,540, Cl. 279-91.000.
King, Joseph W., to Cleveland Technical Center, Inc. Hot box alarm system. 3,731,087, Cl. 246-169.00d.
King, William R., to Sandoz-Wander, Inc. Switching mechanism for nebulizer-humidifiers. 3,730,225, Cl. 137-625.480.
Kinoshita, Koichi; and Watanabe, Masanori, to Katsuragawa Denki Kabushiki Kaisha. Method for electrophotography. 3,730,709, Cl. 96-1.400.
Kirk, Donald, Jr., to Television Communications Corporation. Electronic communication apparatus for selectively distributing supplementary private programming. 3,730,980, Cl. 178-5.100.
Kirk, Frank: *See*—

Goldsmith, Henry John; and Kirk, Frank, 3,730,183.
Kirk, Frank T.: *See—*
Shutt, Paul K., Jr.; Gurtner, Francis B.; and Kirk, Frank T., 3,730,502.
Kirkman, Wayne V. Paraplegic bed. 3,729,751, Cl. 5-66.000.
Kiscaden, Roy W., to Westinghouse Electric Corporation. Fuel control system for a gas turbine. 3,729,929, Cl. 60-39.28r.
Kitagawa, Hiroshi: *See—*
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Kitchen, Elwyn L., Jr.: *See—*
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Kiyohara, Michiya; and Goto, Hisao, to Osaka Transformer Co., Ltd. Control apparatus for short-circuit arc welding. 3,731,049, Cl. 219-131.00f.
Kjonaas, Manley, to Atlantic Richfield Company. Corrosion inhibiting compositions. 3,730,895, Cl. 252-18.000.
K.K. Morisawa Shashin Shokujiki Seisakusho: *See—*
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Klein, Hugo, to Gebr. Eickhoff Maschinenfabrik und Eisengiesserei m.b.H. Corrugated paperboard cutting apparatus. 3,730,810, Cl. 156-353.000.
Klein, John M.: *See—*
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Klein, Norman Sam, to RCA Corporation. Microwave semiconductor device assembly. 3,731,160, Cl. 317-234.00r.
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Kleiner, Walter, to Staubli Ltd. Dobby with a device for moving all heald frame into the same position. 3,730,232, Cl. 139-66.000.
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Kling, Alice Irene: *See—*
Kling, Nelson G., 3,730,650.
Kling, Nelson G.; deceased (by Kling, Alice Irene; administratrix), to Technicon Instruments Corporation. Peristaltic pump and system therefor. 3,730,650, Cl. 417-475.000.
Klisch, John A.: *See—*
Wiberg, Richard E.; and Klisch, John A., 3,729,979.
Klug, Henry G. Flow metering system for liquid wastes. 3,729,994, Cl. 73-194.00e.
Knapp, Heinrich, to Bosch, Robert, G.m.b.H. Fuel injection apparatus for spark plug-ignited internal combustion engines. 3,730,155, Cl. 123-119.00r.
Knebel, Alfred, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Driving arrangement for rail vehicles, especially high output self-propelled rail vehicles. 3,729,933, Cl. 60-102.000.
Knemeyer, Siegfried. Stability augmentation system for light aircraft providing pilot assist and turn. 3,730,461, Cl. 244-77.00e.
Knight, Gordon Alfred; and Sheasby, Raymond. Halter for pigs. 3,730,143, Cl. 119-130.000.
Knippel, Willis H.: *See—*
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Knoerzer, Jerome J.: *See—*
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Knoll International, Inc.: *See—*
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Knorre, Helmut, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for adhesive varnishing, printing and gluing of plastics. 3,730,757, Cl. 117-47.00a.
Knox, John A.; Smith, John A.; Stout, Roy F., deceased (by Dixon, Richard E., executor), to Halliburton Company. Composition and method for removing copper containing iron oxide scales from ferrous metals. 3,730,901, Cl. 252-87.000.
Kobara, Kiyoshi; Fukuzawa, Tsutomu; and Uzihara, Yuzuru, to Toyoto Jidosha Hambai Kabushiki Kaisha. Engine automatic control system and method for vehicles. 3,731,108, Cl. 290-38.000.
Kobayashi, Tatsuo; and Ueda, Hiroshi, to Minolta Camera Kabushiki Kaisha. Dual light responsive automatic exposure control apparatus. 3,730,063, Cl. 95-10.0ct.
Koch, Paul Joseph; and Lapham, Julie Ann, to Allied Chemical Corporation. Flame retardant polyamide compositions containing certain sulfanilamides. 3,730,939, Cl. 260-37.00n.
Koch, Roland G.: *See—*
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Kochergin, Alexei Ilich: *See—*
Daiker, Artur Lvovich; Morozov, Alexandr Nikolaevich; Veis, Anatoly Ivanovich; Kushtuev, Boris Grigorievich; Novoselov, Nikolai Mikhailovich; Zhuravlev, Viktor Nikolaevich; Zinoviev, Alexei Fedorovich; Alfeev, Ivan Ivanovich; Nikitin, Viktor Ivanovich; Kocergin, Alexei Ilich; Matashkov, Vladimir Filippovich; Karelin, Nikolai Ivanovich; Volchematiev, Jury Venediktovich; Zaluzhentsev, Veniamin Fedorovich; and Morozov, Gennady Yakovlevich, 3,730,504.
Kocks, Friedrich. Methods and apparatus for rolling. 3,729,972, Cl. 72-228.000.
Kodaira, Ryoji: *See—*
Komatsu, Kenichi; Saijo, Akira; Haneda, Katsuji; Kodaira, Ryoji; and Ohsawa, Hiroshi, 3,730,836.
Kodis, Rudolfs, to Phillips Petroleum Company. Apparatus for controlling the pick count per inch of a loom. 3,730,230, Cl. 139-24.000.
Koehler, Albert M., to Brown & Root, Inc. Offshore tower. 3,729,940, Cl. 61-46.500.
Koerner, Gotz; and Rossmy, Gerd, to Goldschmidt, Th., AG. Method of enveloping the particles of a dispersed phase. 3,730,905, Cl. 252-316.000.
Kogelnik, Herwig Werner: *See—*
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Kolozsvary, Arpad. Structural component and structures comprising the same. 3,729,876, Cl. 52-81.000.
Komatsu, Kenichi; Saijo, Akira; Haneda, Katsuji; Kodaira, Ryoji; and Ohsawa, Hiroshi, to Asahi Kasei Kogyo Kabushiki Kaisha. Process for producing adenosine by fermentation. 3,730,836, Cl. 195-28.00n.
Komendowski, Henry, to Automatic Liquid Packaging, Inc. Plastic container. 3,730,372, Cl. 215-32.000.
Komiya, Sampei. Swash plate type compressor for automobile air-conditioning. 3,730,648, Cl. 417-269.000.
Komoda, Tsutomu, to Hitachi Ltd. Electron gun device of field emission type. 3,731,095, Cl. 250-49.50a.
Kondo, Kenichiro: *See—*
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Konishiroku Photo Industry Co. Ltd.: *See—*
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Konkel, Joseph: *See—*
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Konno, Akira, to Pioneer Electronic Corporation. Method and apparatus for remotely manipulating an automatic telephone answering device. 3,730,997, Cl. 179-6.000.
Kono, Yoshinori; Iwasaki, Norio; Sato, Tosho; Mizuno, Masaya; and Takeuchi, Jikko, to Fuji Telecasting Company Ltd. Picture and writing recorder using ball-pen system. 3,730,975, Cl. 178-5.20r.
Kopp, Carl J.: *See—*
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Kopp, Heinrich: *See—*
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Kosaka, Kenzo; Adachi, Kiyoshi; Kitagawa, Hiroshi; Nakamura, Tunehiko; and Kato, Osami, to Mitsubishi Rayon Company Limited. Process and apparatus for continuously relaxing textile yarns. 3,729,831, Cl. 34-23.000.
Kostrjukov, Gennady Vasilievich: *See—*
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Koszelak, Thaddeus Donald: *See—*
Gilman, Paul Brewster, Jr.; Raleigh, Ronald George; and Koszelak, Thaddeus Donald, 3,730,723.
Kottowski, Heinz; and Grass, Gunther, to European Atomic Energy Community. Process and apparatus for the uniform distribution of coolant to heating surfaces in a metal-cooled reactor or evaporator. 3,730,266, Cl. 165-186.000.
Kovacs, Laszlo I.; and Schmoock, Roy F., to Fischer & Proctor Co. Pressure and temperature compensation system for flowmeter. 3,729,995, Cl. 73-194.00b.
Kovats, Leslie P., to Anheuser-Busch, Incorporated. Process of producing dextrin esters of maleic acid copolymers. 3,730,925, Cl. 260-17.4st.
Kowalski, Valentine Walter, to Riley-Beaird, Inc., mesne. Multi-stage flash evaporator for distilling brines. 3,730,848, Cl. 202-173.000.

Kozbelt, Lloyd S., to Emerson Electric Co. Band-type electric heaters. 3,730,373, Cl. 219-535.000.

Kraisel, August: *See—*
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Kramer, Franklin; Soeldner, Albert W.; and Paradis, Joseph R., to La Touraine-Bickfords Foods, Inc. Carton loading apparatus. 3,729,895, Cl. 53-59.00r.

Kreizel, William J.; and Ciuzio, Richard T., to Armstrong Cork Company. Knock-down table structure. 3,730,109, Cl. 108-156.000.

Kreuter, Kenneth G.; and Mueller, Klaus P., to Robertshaw Controls Company. Condition responsive parameter control means. 3,730,428, Cl. 236-87.000.

Krey, Winfried, to Varta Gesellschaft mit beschrankter Haftung. Separator for galvanic dry cells employing aqueous electrolyte. 3,730,777, Cl. 136-131.000.

Krings, Peter: *See—*
Disch, Karlheinz; Krings, Peter; Kuhling, Dieter; Bellinger, Horst; and Perner, Johannes Jurgen, 3,730,902.

Krock, Elmer W.; and Simon, Charles J., to GTE Automatic Electric Laboratories Incorporated. Non-dial station service for PABX telephone system. 3,731,003, Cl. 179-27.0ff.

Krone GmbH: *See—*
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Krueger, Hans: *See—*
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Krueger, Rudolph E. Hydraulic backstay tensioner. 3,730,125, Cl. 114-109.000.

Krutz, Ronald L.; and Villella, Thomas J., to Gulf Research & Development Company. Data accumulation and transmission system for use between remote locations and a central location. 3,731,277, Cl. 340-163.00r.

Krylow, Konstanty E.; and Reimer, William A., to GTE Automatic Electric Laboratories Incorporated. Frontal heat exchanger for racks of heat dissipating apparatus. 3,730,264, Cl. 165-128.000.

Kuehl Donald Roy: *See—*
Cook, Russell John; Kuehl Donald Roy; and Mueller, David Charles, 3,730,738.

Kuhling, Dieter: *See—*
Disch, Karlheinz; Krings, Peter; Kuhling, Dieter; Bellinger, Horst; and Perner, Johannes Jurgen, 3,730,902.

Kunda, Wasyl; and Randell, Donald Alan, to Gordon, Sherrit, Mines Limited. Method of producing cobalt-coated composite powder. 3,730,756, Cl. 117-47.00r.

Kunselman, Maurice H.: *See—*
Odom, Clyde H.; and Kunselman, Maurice H., 3,730,689.

Kunz, Raymond W.; and Schulz, Albert E., to General Electric Company. Sensing means for electric fan heater. 3,731,057, Cl. 219-363.000.

Kupsky, George A., to Burroughs Corporation. Gaseous discharge display device with improved cathode electrodes. 3,731,131, Cl. 313-109.500.

Kurkjian, Haig. Air traffic control utilizing rotating radial signals. 3,731,312, Cl. 343-112.0tc.

Kuroda, Minoru, 1/2 to Nishizawa Shoji Co., Ltd. and 1/2 to Dimension Weld International, The. Die for making beaded article. 3,730,814, Cl. 156-515.000.

Kuroyanagi, Masahi: *See—*
Masuda, Noboru; Kuroyanagi, Masahi; and Kase, Hiroaki, 3,731,007.

Kushtuev, Boris Grigorievich: *See—*
Daiker, Artur Lvovich; Morozov, Alexandr Nikolaevich; Veis, Anatoly Ivanovich; Kushtuev, Boris Grigorievich; Novoselov, Nikolai Mikhailovich; Zhuravlev, Viktor Nikolaevich; Zinoviev, Alexei Fedorovich; Alfeev, Ivan Ivanovich; Nikitin, Viktor Ivanovich; Kocergin, Alexei Ilich; Matashkov, Vladimir Filippovich; Karelin, Nikolai Ivanovich; Volchematiev, Jury Venediktovich; Zaluzhentsev, Veniamin Fedorovich; and Morozov, Gennady Yakovlevich, 3,730,504.

Kuster, Kaspar, to Bachofen, Willy A. Suspension dispersing apparatus. 3,730,491, Cl. 259-109.000.

Kusunoki, Sigeru; Murakami, Yoshitsugu; Tashiro, Yutaka; and Tabata, Kazuki, to Bridgestone Tire Company Limited. Pneumatic tire for high-speed motorcycle. 3,730,245, Cl. 152-352.000.

Kuwabara, Takao, to Hitachi, Ltd. Speed governor. 3,730,638, Cl. 415-24.000.

Kvalheim, Andrew M.; and Kvalheim, Irwin S. Method and assembly of universal jamb and trim molding. 3,729,870, Cl. 49-504.000.

Kvalheim, Irwin S.: *See—*
Kvalheim, Andrew M.; and Kvalheim, Irwin S., 3,729,870.

Kwbo, Noriyoshi; Nakamura, Kazuhiro; Endo, Yoshinori; Katano, Takeshi; and Ichinohe, Eisuke, to Matsushita Electric Industrial Co., Ltd. Oscillating circuit. 3,731,228, Cl. 331-111.000.

Kysor Industrial Corporation: *See—*
Wolf, Heinz K.; and Lacey, Ralph W., 3,729,808.

La Touraine-Bickfords Foods, Inc.: *See—*
Kramer, Franklin; Soeldner, Albert W.; and Paradis, Joseph R., 3,729,895.

Laatt, Richard G.; and Rodriguez, Juan A., to Storage Technology Corporation. Apparatus for and method of integration detection. 3,731,208, Cl. 328-127.000.

Labana, Santokh S., to Ford Motor Company. Compositions for powder coatings containing acrylate polymers or esters of fluorinated fatty acids as flow control agents. 3,730,930, Cl. 260-23.0ed.

Lacey, Ralph W.: *See—*
Wolf, Heinz K.; and Lacey, Ralph W., 3,729,808.

Lachaise, Jean M. System for measuring the regeneration threshold of repeaters for multiplex pulse code modulation and data transmission systems. 3,731,011, Cl. 179-175.31r.

Lacoude, Michel: *See—*
Gueussier, Andre; Tricot, Roland; and Lacoude, Michel, 3,730,501.

Lage, Frederick A. Shot shell and method of loading same. 3,730,095, Cl. 102-42.00c.

Laidlaw, Alan James: *See—*
Smith, Geoffrey Allan; and Laidlaw, Alan James, 3,730,676.

Laidman, John N., to Bethlehem Steel Corporation. Method of protecting ferrous strip in hot-dip processes. 3,730,758, Cl. 117-51.000.

Lailach, Gunter; Gerlach, Gottfried; Trenczek, Gerhard; and Brandle, Karl, to Farbenfabriken Bayer Aktiengesellschaft. Production of mixed oxides containing aluminum oxide. 3,730,748, Cl. 106-288.00b.

L'Air Liquide Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude: *See—*
Petit, Pierre, 3,729,943.

Lambert, Gary R.; and Depa, Louis S., to North American Rockwell Corporation. Adjusting arrangement for ink fountain blade. 3,730,090, Cl. 101-365.000.

Lambert, Jacques, to Flaminaire Marcel Quercia. Current-saving electrical igniter for gas lighters. 3,730,670, Cl. 431-256.000.

Lambeth, Dennis Ernest, to Dowty Technical Developments Limited. Hydraulic apparatus. 3,730,656, Cl. 418-131.000.

Lamfers, Benard: *See—*
Van Dyke, John; and Lamfers, Benard, 3,731,213.

Laminar Flow, Inc.: *See—*
Dicicianni, Anthony M., 3,729,905.

Lamm, Heinz, to Daimler-Benz Aktiengesellschaft. Sealing bar for a rotary piston internal combustion engine. 3,730,655, Cl. 418-122.000.

Land, Edwin H.; Bloom, Stanley M.; and Farney, Leonard C., to Polaroid Corporation. Silver image stabilization with noble metal compounds and α,β-enediol developer. 3,730,716, Cl. 96-29.00r.

Land, Edwin H.; and Bachelder, Albert J., to Polaroid Corporation. Illumination device for use with photographic film pack container. 3,731,083, Cl. 240-10.650.

Land, Karl M., to Cities Service Oil Company. Method of increasing productivity and the injectivity of oil wells. 3,730,276, Cl. 166-314.000.

Landauer, Franz; Beermann, Claus; Reuter, Martin; Lebkucher, Karl Heinz; and Kiesling, Hubert, to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning. Wetting agents for alkaline baths. 3,730,903, Cl. 252-156.000.

Landrum, Ralph A., Jr., to Amoco Production Company. Time-compressing multi-transmission signals. 3,731,268, Cl. 340-15.5ta.

Lane, Buddy F., to Avco Corporation. Head or back support for wheelchair. 3,730,589, Cl. 297-391.000.

Lane, Michael Stephen: *See—*
Fairchild, David Lee; and Lane, Michael Stephen, 3,731,001.

Lang, Charles R.; and Schock, Donald N., to Ford Motor Company. Multiple bed catalytic converter. 3,730,691, Cl. 23-288.00f.

Lang, Thomas G. High speed ship with submerged hulls. 3,730,123, Cl. 114-66.50h.

Lange, Eugene A.; and Bryner, Renald F., Jr., to United States of America, Navy. Double cantilever split-pin displacement gage. 3,729,829, Cl. 33-148.00d.

Lapham, Julie Ann: *See—*
Koch, Paul Joseph; and Lapham, Julie Ann, 3,730,939.

Lark Luggage Corporation: *See—*
Pelavin, Joseph Y., 3,730,308.

Larsen, Arthur Bertel, to Bell Telephone Laboratories, Incorporated. Color camera having capacitance compensated index strips. 3,730,977, Cl. 178-5.4st.

Lashley, George D. Automatic shoeshine machine. 3,729,761, Cl. 15-31.000.

Lasier, Thomas R., to Schlage Lock Co. Electrically controlled hold-open device. 3,729,770, Cl. 16-48.500.

Latchford, Joseph T.: *See—*
Fortin, Michael Joseph; Latchford, Joseph T.; and Vandenheuvel, Marinus Theodorus, 3,730,665.

Latina, Roland N., to A-T-O Inc. Protective device for the head. 3,729,745, Cl. 2-9.000.

LaTour, Harry, to Armco Steel Corporation. Method of making article from metallic powders. 3,731,050, Cl. 219-149.000.

Latrobe, Charles H., to Koppers Company, Inc. Method of making leaded-tin bronze alloys. 3,730,705, Cl. 75-156.000.

Lattin, Kenneth R., to United States of America, Atomic Energy Commission. Monitor of the concentration of radioactive iodine in a stream of gas. 3,731,100, Cl. 250-83.6ft.

Lavarenne, Jean, to Societe National Industrielle Aerospatiale. Device for measuring the acceleration of a vehicle. 3,731,147, Cl. 317-5.000.

Lavron, Nikolai Sergeevich: *See—*
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Tkach, Khaim Berkovich; Nazarov, Nikolai Grigorievich; Malbert, Petr Eduardovich; Lavron, Nikolai Sergeevich; Alkasarov, Jury Innokentievich; Legeche, Nikolai Leontievich; Golbinshtein, Alexanr Isovich; Reinsburg, Alexandr Mironovich; Burshtein, Mikhail Vladimirovich; Mikushin, Dmitry Pavlovich; Terskov, Alexei Danilovich; and Belov, Leonid Stepanovich, 3,730,283.

Law, Harold Bell, to RCA Corporation. Method and article for color kinescope screen and mask production. 3,730,719, Cl. 96-36.100.
Lawlor Industries Inc.: *See—*
Miner, Earl L., 3,729,908.
Lawrence, Willis Thompson, to Hooker Chemical Corporation, mesne. Shut-down system for heat storage exchange apparatus. 3,730,265, Cl. 165-134.000.
Lawson, Benjamin, Jr.: *See—*
Kazmierski, John, Jr.; Lawson, Benjamin, Jr.; Thornton, Craig Edward; and Verrelli, Gerard Louis, Jr., 3,730,566.
Lawson, De Wayne L., to Olinkraft, Inc. Combined shipping pallet/container. 3,730,417, Cl. 229-23.00r.
Laybourn, Robert J., to International Business Machines Corporation. Two-way drive mechanism. 3,731,061, Cl. 235-61.11d.
Le Poole, Jan Bart, to U.S. Philips Corporation. Electron beam apparatus with means for generating a rotation-symmetrical magnetic field. 3,731,094, Cl. 250-49.50d.
Leading Plywood Corporation: *See—*
Crawford, John H., 3,730,816.
Lear Siegler, Inc.: *See—*
Brown, Carlton E.; and Armstrong, Raymond I., 3,730,132.
Leavitt, Richard I.: *See—*
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Lecinski, Frank H., to Continental Can Company, Inc. Childproof closure and container. 3,730,370, Cl. 215-9.000.
Lectric Lites Company: *See—*
Blaylock, Arnold O., 3,731,082.
Ledewitz, William; and Twigg, Robert W., to Polytube Inc. Flexible cylinder for collapsible squeeze tube. 3,730,393, Cl. 222-106.000.
Lee, Henry L., Jr.: *See—*
Stoffey, Donald G.; and Lee, Henry L., Jr., 3,730,947.
Lee Pharmaceuticals: *See—*
Stoffey, Donald G.; and Lee, Henry L., Jr., 3,730,947.
Lee, Raymond, Organization, Inc., The: *See—*
Bagby, James M., 3,730,148.
Lee, Raymond, Organization, The: *See—*
Lunney, Helen P., 3,730,197.
Lee, Thomas E.; and Frey, Frederick W., to Ethyl Corporation. Method of improving the grindability of alumina-silica ores. 3,730,445, Cl. 241-23.000.
Leeper, Harold M.; and Ramwell, Peter W., to ALZA Corporation. Novel device coated with a prostaglandin and preparation thereof. 3,730,835, Cl. 195-1.700.
Lefever, Kenneth W. Transmission of mixed petroleum products through a frozen medium. 3,730,201, Cl. 137-13.000.
Leffler, Nils Gustav, to Sunds Aktiebolag. Apparatus for the washing of preferably cellulosic pulp. 3,729,961, Cl. 68-181.00r.
Lefrancois, Louis Alfred Auguste. Sewage disposal method. 3,730,883, Cl. 210-7.000.
Legeche, Nikolai Leontievich: *See—*
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Tkach, Khaim Berkovich; Nazarov, Nikolai Grigorievich; Malbert, Petr Eduardovich; Lavron, Nikolai Sergeevich; Alkasarov, Jury Innokentievich; Legeche, Nikolai Leontievich; Golbinshtein, Alexanr Isovich; Reinsburg, Alexandr Mironovich; Burshtein, Mikhail Vladimirovich; Mikushin, Dmitry Pavlovich; Terskov, Alexei Danilovich; and Belov, Leonid Stepanovich, 3,730,283.
Leger, Roland E. Method and apparatus for transferring electrical energy to high speed apparatus. 3,730,312, Cl. 191-66.000.
Lehmann, Aribert J. Device for tying the ends of bags. 3,729,896, Cl. 53-198.00a.
Leland Gas Turbines Limited: *See—*
Silverstone, Calvin Eric; and Surrall, Alan John, 3,730,538.
Lemoine, Jack. Mechanical toy wheel. 3,729,861, Cl. 46-59.000.
Lenhard, Myron J.: *See—*
Hagenbach, Robert J.; and Lenhard, Myron J., 3,730,707.
Lenk, Erich: *See—*
Schippers, Heinz; Lenk, Erich; and Streppel, Herbert, 3,730,448.
Lenk, Pedro A.; Dunn, William C.; and Mina, Ramses R., to Stromberg-Carlson Corporation. Digital switching network. 3,731,275, Cl. 340-146.1ab.
Leonard, George Hamlin; and Enyeart, Raymond J. Punch and print data card recorder. 3,730,424, Cl. 234-130.000.
Leonard, Loren W. Measuring and servicing the drilling fluid in a well. 3,729,986, Cl. 73-155.000.
Leonard, Richard L.: *See—*
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Lerwick, Everett R.: *See—*
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LeValley, John: *See—*
Buddecke, Charles L.; and LeValley, John, 3,730,172.
Levin, Gilbert V.; and Topol, George J., to Biospherics Incorporated. Internal precipitation of phosphate in settling zone. 3,730,882, Cl. 210-6.000.
Levin, Myron M., to E-Z Por Corporation. Roasting bag. 3,730,076, Cl. 99-347.000.
Levinn, Robert N., to American Thermostat Corporation. High temperature sensing apparatus effective over extensive lengths. 3,731,247, Cl. 337-140.000.
Levinson, Melvin L. Microwave kiln to cook food. 3,731,037, Cl. 219-10.550.
Lewis, David E. Multiple outlet fluid distribution apparatus. 3,730,208, Cl. 137-119.000.
Lewis, John, Inc.: *See—*
Tremblay, Theodose, 3,730,661.
Lewis, Peter Frederick, to English Electric Valve Company Limited. Magnetrons. 3,731,140, Cl. 315-39.610.
Lewis, Philip W.: *See—*
Botterman, David L.; and Lewis, Philip W., 3,730,419.
Lewis, Roy D., to Mateer, G. Diehl, Co. Apparatus for filling containers. 3,730,235, Cl. 141-172.000.
Liang, Charles C., to Mallory, P. R., & Co., Inc. Tin halide cathode for solid electrolyte battery systems. 3,730,775, Cl. 136-83.00r.
Licata, Joseph: *See—*
Spira, Joel S.; and Licata, Joseph, 3,731,142.
Lichtman, Jerome; and Salvi, Joseph, to Stanford Technology Corporation. Tire-testing device. 3,729,992, Cl. 73-146.000.
Liddell, Arlyn G., to Eaton Corporation. Control mechanism. 3,730,017, Cl. 74-471.00r.
Lieberman, Daniel, to GTE Sylvania Incorporated. Monitoring circuit and system for detecting signals in a signal transmission system. 3,731,203, Cl. 325-363.000.
Lieberman, Edgar M., to Mar-Con, Inc. Merchandising aid. 3,730,327, Cl. 198-37.000.
Liebold, Gert: *See—*
Oppenlaender, Knut; Liebold, Gert; and Buettner, Egon, 3,730,906.
Lieffring, Gordon V., to Lieffring Industries, Incorporated. Vehicle modification front end portion of an automobile. 3,730,582, Cl. 296-28.00r.
Lieffring Industries, Incorporated: *See—*
Lieffring, Gordon V., 3,730,582.
Liljeqvist, Alf Harald: *See—*
Aslund, Bert Ake; and Liljeqvist, Alf Harald, 3,729,892.
Lilley, John W.: *See—*
Shane, Hugh J. S.; Schill, John E.; and Lilley, John W., 3,730,907.
Lilly, Eli, and Company: *See—*
Gerzon, Koert, 3,730,956.
Lin, Chao-Han, to National Cash Register Company, The. Pressure-sensitive record materials. 3,730,755, Cl. 117-36.200.
Lindhe, Jarl Soren: *See—*
Ahrland, Sten Harald; Carleson, Bengt Goran Fredrik; and Lindhe, Jarl Soren, 3,730,886.
Lindsay Manufacturing Co.: *See—*
Zimmerer, Arthur L.; Zimmerer, Bernard J.; and Zimmerer, Paul B., 3,730,435.
Linkow, Leonard I.; Weiss, Charles M.; Weiss, Lillian Bishop; and Liwerant, Abram, to Oratronics, Inc. Oral implant. 3,729,825, Cl. 32-10.00a.
Linnett, David T. Multi-component refrigerant for the liquefaction of natural gas. 3,729,945, Cl. 62-40.000.
Linse, Richard C.: *See—*
Gibson, James W.; Videtto, Donald A.; and Linse, Richard C., 3,729,969.
Linthicum, Harley E.: *See—*
Bronne, William B.; and Linthicum, Harley E., 3,729,806.
Lipsicas, Max; and Mattis, Daniel C., to Yeshiva University. Polyconducting device and applications therefor. 3,731,249, Cl. 338-325.000.
Lisle Corporation: *See—*
Huigens, Wilfred J., 3,730,296.
Lissberger, Paul Hans, to Plessey Handel und Investments A.G. Direction-sensitive projection systems for light-diffraction gratings. 3,730,610, Cl. 350-162.0sf.
Little, Donald R.: *See—*
Grundy, Reed H.; and Little, Donald R., 3,731,088.
Little, Donald R. Horsepower and torque measuring instrument. 3,729,989, Cl. 73-133.00r.
Little, Edwin D.: *See—*
Formaini, Robert L.; and Little, Edwin D., 3,730,923.
Litton Business Systems, Inc.: *See—*
Hare, Lloyd E., 3,730,322.
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Litton Systems, Inc.: *See—*
Jarvis, George A.; and Danley, Allen M., 3,731,035.
Spadoni, Frank G., Jr., 3,731,261.
Litzenberger, Carl R. Trailer hitch safety device. 3,730,558, Cl. 280-511.000.
Litzka, Fran. Tetherball game with score counter. 3,730,526, Cl. 273-95.00a.
Liwerant, Abram: *See—*
Linkow, Leonard I.; Weiss, Charles M.; Weiss, Lillian Bishop; and Liwerant, Abram, 3,729,825.
Lockheed Aircraft Corporation: *See—*
Boggs, Wilburn A.; and Miller, Robert N., 3,730,937.
Geisler, Wilson S., Jr., 3,730,776.
Loffler, Tilo: *See—*
Schindler, Herbert; and Loffler, Tilo, 3,729,758.
Loftus, Peter J., to Alcotronics Corporation. Inertia type switch with coaxial conductive springs. 3,731,022, Cl. 200-61.490.
Logan, John S.: *See—*
Colovas, Denny D.; Logan, John S.; and Skruch, Richard R., 3,730,583.
Lomax, Dennis L.: *See—*

Christian, Donald K.; and Lomax, Dennis L., 3,729,958.

Lonardo, Vincent P. Air actuated vacuum pump. 3,730,647, Cl. 417-122.000.

Looms, Peter, to Flowers A La Karte, Inc. Refrigerated display case for flowers and the like. 3,730,603, Cl. 312-116.000.

L'Oreal: *See—*
Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, 3,730,677.

Lorenz, Edward E. Carburetor idle limiter tool. 3,729,802, Cl. 29-254.000.

Loshaek, Samuel: *See—*
Stehle, Peter Fallon; Dickstein, Jack; and Loshaek, Samuel, 3,730,933.

Louthan, Rector P., to Phillips Petroleum Company. Removal of odor-causing materials from sulphur-containing plasticizers by distillation with a hydrocarbon. 3,730,850, Cl. 203-52.000.

Lovell, John A.; and Harris, Philip G., to Goodyear Tire & Rubber Company, The. Composite of fabric with flexible backing. 3,730,822, Cl. 161-66.000.

Lowe, Richard B.; and Enabnit, Robert S., to Goodyear Tire and Rubber Company, The. Belt damage detector. 3,731,113, Cl. 307-119.000.

Lowry, Denis E.: *See—*
Campbell, Jesse L.; Klein, Walter F.; and Lowry, Denis E., 3,730,602.

Lucas, Joseph, (Industries) Limited: *See—*
Cryer, Edward, 3,731,272.

Lucas, William H.; and Jones, Kenneth G., 1/4 interest each to Olson, LeRoy E., and Patrickus, Sylvester A. Method and apparatus for banding articles. 3,729,886, Cl. 53-24.000.

Ludtke, Arnold: *See—*
Pfeuffer, Alfred; Kalkhof, Gustav; Weber, Helmut; and Ludtke, Arnold, 3,730,780.

Luenser, Kurt K., to Verson Allsteel Press Company. Control system for a plural speed press. 3,730,313, Cl. 192-12.00c.

Luke, Owen B. Liquid level sensor. 3,729,997, Cl. 73-302.000.

Lunardini, Alipio. Road vehicle benches for straightening indentations in vehicle bodies. 3,729,978, Cl. 72-457.000.

Lund, Egon, to Danfoss A/S. Method of and apparatus for drying motor compressors. 3,729,832, Cl. 34-34.000.

Lund, Robert S., to Pettibone Corporation. Apparatus for the continuous mixing of granular materials. 3,730,487, Cl. 259-6.000.

Lunney, Helen P., to Lee, Raymond, Organization, The. Bag with collapsible umbrella. 3,730,197, Cl. 135-16.000.

Luscher, Paul; Hudson, Ben A.; and Childers, Billie W. Apparatus for coating and impregnating texturized yarn. 3,730,137, Cl. 118-325.000.

Lusk, Harold B.; Cooke, Herbert E.; and Pryor, Leon D., to Beaunit Corporation. Method for treating yarn. 3,729,916, Cl. 57-34.0hs.

Lutron Electronics Co., Inc.: *See—*
Spira, Joel S.; and Licata, Joseph, 3,731,142.

Lutz, Roman, to Siemens Aktiengesellschaft. Teleprinter subscriber set having a remote switching group for galvanic decoupling from the connecting line and a circuit arrangement for enabling local operation. 3,730,973, Cl. 178-2.00r.

Lyst, Harold E.: *See—*
Griffis, Juniper, 3,730,591.

Macdonald, Howard R., to Rohr Corporation. Sound suppression system. 3,730,292, Cl. 181-33.0hc.

Machida, Takayasu: *See—*
Nikaido, Akira; Onda, Mitsuo; Nakajima, Fumio; Okano, Terutaka; Machida, Takayasu; Toida, Takashi; and Yanagawa, Yoshihiko, 3,731,125.

Machii, Tetsuo: *See—*
Suenaga, Masanobu; Machii, Tetsuo; and Sugioka, Syuji, 3,731,162.

Machmiller, Alfred A., to International Business Machines Corporation. Vertical centrifugal spin coating method. 3,730,760, Cl. 117-101.000.

Macleod, David E., to Carrier Corporation. Self-contained air conditioning unit. 3,729,952, Cl. 62-428.000.

MacVicar, Margaret L. A.; Freake, Stuart M.; and Adkins, Clement J., to Massachusetts Institute of Technology. Electrode-carbon-electrode junctions. 3,731,158, Cl. 317-234.00r.

Madden, William M; and Teagle, Richard E., to United Aircraft Corporation. Synchronized exhaust nozzle actuating system. 3,730,436, Cl. 239-265.390.

Maddock, Bruce H., to Union Carbide Corporation. Mixing of thermoplastic materials. 3,730,492, Cl. 259-193.000.

Madejczyk, Leopold A., to Ford Motor Company. Catholyte rinse of electrocoat. 3,730,866, Cl. 204-181.000.

Mader, Heinz Bernhard; and Hochreutiner, Roger Maurice, to International Standard Electric Corporation. Phase locked loop. 3,731,219, Cl. 331-14.000.

Madison, George L. Exercise for paraplegic patients. 3,730,174, Cl. 128-25.000.

Maeda, Taketora, to Epoch Company, Ltd. Baseball game with ball deflecting pitcher mechanism. 3,730,525, Cl. 273-89.000.

Magnus, Bruno E., to GAF Corporation. Granule applicator. 3,730,397, Cl. 222-254.000.

Magnusen, David L., to United States Gypsum Company. Furniture supporting system. 3,730,468, Cl. 248-246.000.

Maher, George G., to United States of America, Agriculture. Starch xanthate derivatives used in papermaking. 3,730,829, Cl. 162-175.000.

Mailhot, Armand Ludovic: *See—*
Sloane, Ivan Henry; Mailhot, Armand Ludovic; Beliveau, Roger Louis; and Sawhney, Harbans Lal, 3,729,917.

Maillet, Wilfrid G.: *See—*
Schmidt, William G.; Gabbard, Ova G.; Husted, John M.; Maillet, Wilfrid G.; and Bos, Marinus A., 3,730,998.

Main, John: *See—*
Stewart, David Bruce; Newtyle, Angus; Main, John; Kettins, Angus; and Duncan, Maurice, 3,730,802.

Maison, Richard L., to Rohr Industries, Inc. Collector sled and mounting structure therefor for high speed, track mounted electric vehicle. 3,730,311, Cl. 191-49.000.

Makino, Kiyoji: *See—*
Akiyama, Keiiti; and Makino, Kiyoji, 3,730,948.

Makrides, Alkis C.; and Brummer, Samuel B., to Tyco Laboratories, Inc. Electrochemical control of adsorption and desorption with activated carbon. 3,730,885, Cl. 210-30.000.

Maksutov, Rafkhat; Asfandiyarov, Khalim Akhmetovich; Pashin, Vasily Fedorovich; Gubarev, Yakov Fedorovich; Sadykov, Rifgat Suleimanovich; Akhunov, Albert Musagitovich; Vakhitov, Gadel Galyautdinovich; Graifer, Valery Isaakovich; Zyalyaev, Vagiz Murzakhanovch; Kostrjukov, Gennady Vasilievich; and Efanov, Boris Fedorovich; deceased (by Efanova, Olga Iosifovna; administratrix). Process for coating with glass the internal surface of metal pipes. 3,729,803, Cl. 29-421.000.

Malbert, Petr Eduardovich: *See—*
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Tkach, Khaim Berkovich; Nazarov, Nikolai Grigorievich; Malbert, Petr Eduardovich; Lavron, Nikolai Sergeevich; Alkasarov, Jury Innokentievich; Legeche, Nikolai Leontievich; Golbinshtein, Alexanr Isovich; Reinsburg, Alexandr Mironovich; Burshtein, Mikhail Vladimirovich; Mikushin, Dmitry Pavlovich; Terskov, Alexei Danilovich; and Belov, Leonid Stepanovich, 3,730,283.

Malet, Michael Anley; and Hills, David Leslie, to National Research Development Corporation. Mold assembly for pressing concrete. 3,730,657, Cl. 425-3.000.

Mallory, P. R., & Co., Inc.: *See—*
Liang, Charles C., 3,730,775.

Mames, Michel; and Berthon, Robert, to Mines de Potasse d'Alsace. Flotation of coarse particles. 3,730,341, Cl. 209-164.000.

Manning, Jim L.; and Manning, Richard D., 5% to Klein, John M. Pet feeder. 3,730,141, Cl. 119-51.500.

Manning, Richard D.: *See—*
Manning, Jim L.; and Manning, Richard D., 3,730,141.

Mansell, Dennis N., to United States of America, Air Force. Beam scanner for high power laser. 3,731,106, Cl. 250-236.00r.

Mansfield Heat Limited: *See—*
Beech, Sydney George, 3,731,039.

Mar-Con, Inc.: *See—*
Lieberman, Edgar M., 3,730,327.

Marand, Jean, to Ciba-Geigy Corporation. Coupler-aspirator-valve assembly. 3,730,392, Cl. 222-82.000.

Marathon Oil Company: *See—*
Allred, Victor D., 3,730,270.
Allred, Victor D., 3,730,849.

Marcade, Roque D.: *See—*
Janke, Donald E.; and Marcade, Roque D., 3,729,833.

Marchione, Joseph H., to Atwood Vacuum Machine Company. Torsion bar hold-open hinge. 3,729,772, Cl. 16-145.000.

Marchisotto, Robert: *See—*
Wei, Ling; and Marchisotto, Robert, 3,730,960.

Marckx, Edward I.; and Stines, Harvey F., to Stinemark Corporation. Bread and pastry processing apparatus. 3,730,032, Cl. 83-11.000.

Marconi Company Limited, The: *See—*
Terry, John Brian; and Corlett, David Fleming, 3,730,994.

Marcum, Harold E.: *See—*
Harrison, Robert S.; and Marcum, Harold E., 3,730,153.

Maremont Corporation: *See—*
Downing, Todd R., 3,729,782.

Marian, Daniel; and Ramun, Michael. Variable offset spring mounting block for load-bearing vehicles. 3,730,508, Cl. 267-52.000.

Marini, Richard: *See—*
Baues, Dietrich; Marini, Richard; and McCauley, Donald, 3,729,824.

Marino, Patrick John: *See—*
Gordon, Travis Hill; Marino, Patrick John; and Pilc, Randolph John, 3,731,281.

Marmoud, Edmond: *See—*
Brigiliano, Florent; Vogt, Ernest; and Marmoud, Edmond, 3,729,923.

Marra, Theodore F., to Goodyear Tire & Rubber Company, The. Segmented tire mold. 3,730,658, Cl. 425-47.000.

Marsh, Anthony, to Plessey Handel und Investments AG. Circular magnetic domain devices. 3,731,288, Cl. 340-174.0tf.

Marshall, Robert Moore; and Dardoufas, Kimon Constantine, to Allied Chemical Corporation. Production of polyesters. 3,730,892, Cl. 252-8.750.

Marson, Richard A.: *See—*
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Marston, James W.; and Bolton, Percy J., to North American Rockwell Corporation. Method of forming an impregnated textile bobbin. 3,729,813, Cl. 29-527.200.

Martin, Aubrey Wilfred, to Republic Rubber Industries (Proprietary) Limited. Retreading of tyres. 3,730,801, Cl. 156-96.000.

Martin, Billy Otis: *See*—
Mueller, Fritz Kurt; Martin, Billy Otis; Chandler, James Parker; and Martin, Robert Cherry, 3,729,998.

Martin, Henry F.: *See*—
De Rouen, Joseph R.; Baldwin, Kenneth B.; and Martin, Henry F., 3,729,817.

Martin, Robert Cherry: *See*—
Mueller, Fritz Kurt; Martin, Billy Otis; Chandler, James Parker; and Martin, Robert Cherry, 3,729,998.

Martin-Marietta Corporation: *See*—
Wolcott, John R.; and Wiggins, MacDonald J., 3,730,628.

Marzocchi, Alfred, to Owens-Corning Fiberglas Corporation. Glass fiber reinforced elastomers. 3,730,759, Cl. 117-72.000.

Masaaki, Sato: *See*—
Fukami, Mashakaru; Masaaki, Sato; and Toshiyuki, Mori, 3,730,645.

Maschinen-Konstruktions-Gesellschaft mit beschrankter Haftung, Firma: *See*—
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Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft Werk Nurnberg: *See*—
Elsbett, Gunter; and Elsbett, Ludwig, 3,730,163.

Maschinenfabrik Buckau R. Wolf AG: *See*—
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Maschinenfabrik Buckau R. Wolf Aktiengesellschaft: *See*—
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Pause, Kurt, 3,730,768.

Maschinenfabrik Fahr AG: *See*—
Purrer, Josef, 3,730,037.

Mason, Gene C., to French Oil Mill Machinery Company, The. Apparatus for continuous rendering of fat-containing materials. 3,730,344, Cl. 210-152.000.

Massachusetts Institute of Technology: *See*—
Bers, Abraham, 3,731,214.
Dewey, Clarence Forbes, Jr., 3,731,110.
MacVicar, Margaret L. A.; Freake, Stuart M.; and Adkins, Clement J., 3,731,158.

Massett, Franklin Louis. Specimen drying apparatus. 3,729,835, Cl. 34-225.000.

Massey, Alton A. Cryogenic liquid handling system. 3,729,946, Cl. 62-51.000.

Masuda, Noboru; Kuroyanagi, Masahi; and Kase, Hiroaki, to Denki Onkyo, Ltd. Magnetic head having a magneto-resistive bridge circuit. 3,731,007, Cl. 179-100.2ch.

Masuda, Noboru, to Denki Onkyo Co., Ltd. Decimal-binary code conversion system. 3,731,074, Cl. 235-155.000.

Matashkov, Vladimir Filippovich: *See*—
Daiker, Artur Lvovich; Morozov, Alexandr Nikolaevich; Veis, Anatoly Ivanovich; Kushtuev, Boris Grigorievich; Novoselov, Nikolai Mikhailovich; Zhuravlev, Viktor Nikolaevich; Zinoviev, Alexei Fedorovich; Alfeev, Ivan Ivanovich; Nikitin, Viktor Ivanovich; Kocergin, Alexei Ilich; Matashkov, Vladimir Filippovich; Karelin, Nikolai Ivanovich; Volchematiev, Jury Venediktovich; Zaluzhentsev, Veniamin Fedorovich; and Morozov, Gennady Yakovlevich, 3,730,504.

Matchen, Ben; and Robertson, David, to Norton Research Corporation (Canada) Limited. Boron carbide ballistic armor modified with calium boride, titanium and/or manganese. 3,730,826, Cl. 161-193.000.

Matchen, Ben; Robertson, David; and Scott, John J., to Norton Research Corporation (Canada) Limited. Boron carbide ballistic armor modified with copper. 3,730,827, Cl. 161-193.000.

Mateer, G. Diehl, Co.: *See*—
Lewis, Roy D., 3,730,235.

Mathews, Max Vernon, to Bell Telephone Laboratories, Incorporated. Voice switched microphone control system. 3,730,995, Cl. 179-1.0vc.

Mathewson, Wilfred F.: *See*—
Wright, Archibald N.; and Mathewson, Wilfred F., 3,729,814.

Matsumoto, Haruo, to Matsumoto Metal Company Limited. Ring-style cap opener. 3,730,026, Cl. 81-3.46r.

Matsumoto Metal Company Limited: *See*—
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Matsuo, Syunji: *See*—
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Matsushita Electric Industrial Co., Ltd.: *See*—
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Nadaguchi, Takeshi, 3,731,016.
Yamamoto, Hiroshi, 3,730,784.

Matsushita Electronics Corporation: *See*—
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Nakashima, Shinichi; Inoue, Morio; and Iwasa, Hitoo, 3,730,800.
Wakai, Shuzo; and Sugano, Hitoshi, 3,730,978.

Matsushita, Takeshi, to Sony Corporation. Magnetic field detecting apparatus. 3,731,123, Cl. 307-309.000.

Mattei, Silvano: *See*—
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Ullmann, Werner; Rabian, Laszlo; Mattei, Silvano; Sieg, Arno; Suter, Peter; Tadini, Costantino; Panschow, Rudolf; Suhr, Volker; and Meyer, Wolfgang, 3,731,045.

Matthews, Donald R., to United States of America, Navy. Apparatus for the in-place destruction of filed documents. 3,730,111, Cl. 109-29.000.

Mattis, Daniel C.: *See*—
Lipsicas, Max; and Mattis, Daniel C., 3,731,249.

Matzen, Walter T., to United States of America, Air Force. State retention circuit for radiation hardened flip flop. 3,731,119, Cl. 307-291.000.

Mayeda, Wataru. Teaching apparatus. 3,729,836, Cl. 35-6.000.

Mayer, Gerald M.: *See*—
Johnson, Cameron D.; Mayer, Gerald M.; and Morency, Roger L., 3,729,980.

Mayer, Manfred; and Naydowski, Reinhard, to Barmag Barmer Maschinenfabrik Aktiengesellschaf. Automatic device for loading textile machine spindles. 3,729,915, Cl. 57-53.000.

Mayer, Oscar, & Co., Inc.: *See*—
Seiferth, Oscar E.; and Austin, Glenn M., 3,730,739.

Mayer, Richard W.: *See*—
Fields, Walter M.; and Mayer, Richard W., 3,730,820.

Mazzone, Charles P.; and Pike, Herbert J., to Stevens, J. P., & Co., Inc. Process for producing sculptured effects on thermoplastic pile fabrics. 3,729,784, Cl. 26-2.00r.

Mc Cord, Robert S.; Nail, Donald H.; and Sheratte, Martin B., to McDonnell Douglas Corporation. Functional fluid compositions of increased fire resistance. 3,730,898, Cl. 252-78.000.

McAfee, Richard J., to United States Steel Corporation. Mixer ladle structure. 3,730,506, Cl. 266-39.000.

McAlpine, Ernest, to Burgess Micro Switch Company Limited. Operating members for snap-action switches. 3,731,031, Cl. 200-172.00r.

McCain Manufacturing Corporation: *See*—
Bellanca, Joseph V., 3,730,512.

McCann, Joseph A., to Anheuser-Busch, Incorporated. Microwave diode with low capacitance package. 3,731,159, Cl. 317-234.00r.

McCarthy, John P.: *See*—
Daniels, Charles K.; and McCarthy, John P., 3,731,263.

McCarthy, William C.; and De Lano, Merritt V., Jr., to Phillips Petroleum Company. Liquid-liquid contacting means. 3,730,690, Cl. 23-270.500.

McCauley, Donald: *See*—
Baues, Dietrich; Marini, Richard; and McCauley, Donald, 3,729,824.

McClaflin, Gifford G.; and Royer, Dennis J., to Continental Oil Company. Method using low friction loss liquid composition having resistance to shear degradation. 3,730,275, Cl. 166-308.000.

McClure, Charles A. Strand treatment. 3,729,914, Cl. 57-34.0hs.

McConnaughay, Harold: *See*—
Kaman, Frank A.; and McConnaughay, Harold, 3,730,239.

McConnell, John A.; and Williamson, Everett W. Pill dispensing device having plural cut-off trap chamber. 3,730,387, Cl. 221-265.000.

McCord, Robert S.; Nail, Donald H.; and Sheratte, Martin B., to McDonnell Douglas Corporation. Fire-resistant functional fluid compositions. 3,730,889, Cl. 252-78.000.

McCord, Robert S.; Nail, Donald H.; and Sheratte, Martin B., to McDonnell Douglas Corporation. Fire-resistant functional fluids. 3,730,897, Cl. 252-78.000.

McCuthcheon, James T., to Itek Corporation. Ink monitoring apparatus. 3,730,089, Cl. 101-363.000.

McDermott, Peter; and Campbell, Colin, to Imperial Chemical Industries Limited. Interlacing jet. 3,730,413, Cl. 226-97.000.

McDonald, Emery L. Apparatus for removing the skin from vertebrate such as fish & animals. 3,729,775, Cl. 17-62.000.

McDonnell Douglas Corporation: *See*—
Hanback, Francis J.; and Robinson, Norman F., 3,730,563.
Mc Cord, Robert S.; Nail, Donald H.; and Sheratte, Martin B., 3,730,898.
McCord, Robert S.; Nail, Donald H.; and Sheratte, Martin B., 3,730,889.
McCord, Robert S.; Nail, Donald H.; and Sheratte, Martin B., 3,730,897.
Mullen, John H.; and Theby, Edward A., 3,731,047.

McFiggans, Robert B., to Pitney-Bowes, Inc. Automatic phase switching of phase-coded recordings. 3,731,293, Cl. 340-174.10h.

McGinn, James M., to Uniroyal, Inc. Process for production of rigid self-skinning polyurethane foam. 3,730,919, Cl. 260-2.5az.

McGrath, Raymond F. Iron guard. 3,729,778, Cl. 24-73.00r.

McGraw-Edison Company: *See*—
Weir, Henry John, 3,729,846.

McIntosh, Alexander C.: *See*—
Herr, Charles H.; and McIntosh, Alexander C., 3,730,314.

McKee, Douglas W.; and Scarpellino, Anthony J., Jr., to General Electric Company. Ammonia fuel cell with iridium catalyst and method of using the cell. 3,730,774, Cl. 136-86.00r.

McKeithan, Wesley L.: *See*—
Spisak, Raymond J.; Becker, Robert N.; and McKeithan, Wesley L., 3,731,018.

McKenzie, Leo A. Bricklayers line holder. 3,729,828, Cl. 33-86.000.

McKeown, James E., to Bendix Corporation, The. Direct current powered ignition system with blocking oscillator. 3,731,144, Cl. 315-209.00t.

McKeown, James E.; and Michel, Donald E., to Bendix Corporation, The. Printed circuit board connector. 3,731,252, Cl. 339-17.00l.

McKie, James E., Jr., to Pfizer Inc. Mass screening test for serum trypsin inhibitors. 3,730,843, Cl. 195-103.50r.

McLeod, Gordon Donald, to Stauffer Chemical Company. Zinc dust coating composition. 3,730,743, Cl. 106-1.000.

McMahon, William. Gear arrangement for providing an oscillating rotational motion. 3,730,654, Cl. 418-34.000.

McRae, Allen A. Golf cart handle attachment for grip, wrist and forearm exercise. 3,730,523, Cl. 272-67.000.

McRae, Russell C.; and Stuart, William R., to Varian Associates. High-intensity arc lamp. 3,731,133, Cl. 313-113.000.

McWhorter, Daniel M., to Kendall Company, The. Manometer. 3,730,168, Cl. 128-2.00f.

Me Company: *See—*
Naunheim, Geraldine R., 3,729,865.

Mead Corporation, The: *See—*
Cahill, Lysle D.; and Denlinger, George William, 3,730,011.

Mead, Robert H.; and Zimmer, George A., to Borg-Warner Corporation. Composite drive wheel. 3,730,009, Cl. 74-243.00r.

Mederer, Andreas, to Messerschmitt-Blokow-Blohm GmbH. Jet-propelled aircraft with means for thrust deflection. 3,730,460, Cl. 244-53.00r.

Meditron Inc.: *See—*
Harvey, Robert J.; and Celebi, Gurbuz Ali, 3,730,737.

Medney, Jonas; and Baumgarten, Donald J., to Koppers Company, Inc. Filament winding method. 3,730,795, Cl. 156-169.000.

Meiser, Kenneth D., to Plastics Manufacturing Company. Postformable laminate comprising a barrier sheet of wood fiber impregnated with fully cured unplasticized melamine-formaldehyde resin. 3,730,828, Cl. 161-258.000.

Melendy, Harold A.: *See—*
Drutchas, Gilbert H.; Clark, Hubert M.; and Melendy, Harold A., 3,730,653.

Menke, Wilhelm, to NSM Apparatebau GmbH. Forward and backward roller counter especially with preselector means. 3,731,066, Cl. 235-92.0cn.

Merck Patent Gesellschaft mit beschrankter Haftung: *See—*
Schmitt, Dieter; Stein, Alfred; and Baumer, Wilhelm, 3,730,688.

Meri, Kalju, to Electrospace Corporation. Circuit for energizing and de-energizing a relay to control the operation of a tape recorder. 3,731,008, Cl. 179-100.20s.

Mesek, Frederick K., to Johnson & Johnson. Disposable diaper. 3,730,184, Cl. 128-287.000.

Messer Griesheim G.m.b.H.: *See—*
Pfeuffer, Alfred; Kalkhof, Gustav; Weber, Helmut; and Ludtke, Arnold, 3,730,780.

Messerschmidt, Harold J., Jr.; Heyman, Karl; and Johnsen, Bernadou W., II. Powderless etching bath additive. 3,730,899, Cl. 256-14.000.

Messerschmitt-Blokow-Blohm GmbH: *See—*
Mederer, Andreas, 3,730,460.

Messerschmitt-Bolkow-Blohm GmbH: *See—*
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Metaframe Corporation: *See—*
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Metal Box Company Limited, The: *See—*
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Metalized Ceramics Corporation: *See—*
Shearman, Paul M., 3,731,005.

Metallurgic Hobken-Overpelt: *See—*
Richardson, Frederick Denys; and Rogers, Philip Sydney, 3,730,698.

Metz, Thomas R., to Conoflow Corporation. Averaging digital rate indicator. 3,729,996, Cl. 73-194.00e.

Metzler, Norbert: *See—*
Voigt, Gunter; and Metzler, Norbert, 3,729,821.

Meyer, Bennett A.; Burns, Thomas A.; and Anelli, Peter, to Singer Company, The. Doppler radar simulator. 3,731,309, Cl. 343-17.700.

Meyer, Hans: *See—*
Weichardt, Helmut; Glander, Fritz; Ziemek, Gerhard; Schuppe, Walter; Meyer, Hans; and Eilhardt, Bernd, 3,729,919.

Meyer, Hans Peter, to International Standard Electric Corporation. Switching relay with a make-and-break contact member. 3,731,240, Cl. 335-196.000.

Meyer, Wolfgang: *See—*
Ullmann, Werner; Panschow, Rudolf; Shur, Volker; Meyer, Wolfgang; Sieg, Arno; and Rabian, Laszlo, 3,731,043.
Ullmann, Werner; Rabian, Laszlo; Mattei, Silvano; Sieg, Arno; Suter, Peter; Tadini, Costantino; Panschow, Rudolf; Suhr, Volker; and Meyer, Wolfgang, 3,731,044.
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Meyers, Dale J., to Goodyear Tire & Rubber Company, The. Crash pad containing a radio shielding element. 3,731,202, Cl. 325-357.000.

MFG Manufacturing Co.: *See—*
Friden, John Frederick, 3,730,057.

Michael, Thomas M. Apparatus for distributing a sample of blood to a plurality of cultures. 3,730,170, Cl. 128-2.00f.

Michalik, Edmund R.: *See—*
Dahlberg, John R.; Oravitz, James L., Jr.; and Michalik, Edmund R., 3,730,408.

Michals, Richard A.: *See—*
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Michel, Donald E.: *See—*
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Micro Devices Corporation: *See—*
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Micro Information Systems, Inc.: *See—*
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Microdot Inc.: *See—*
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Microsystems International Limited: *See—*
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Middleton, Verne L., to Olin Corporation. Method of making a mechanical joint. 3,729,804, Cl. 29-432.000.

Mikushin, Dmitry Pavlovich: *See—*
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Tkach, Khaim Berkovich; Nazarov, Nikolai Grigorievich; Malbert, Petr Eduardovich; Lavron, Nikolai Sergeevich; Alkasarov, Jury Innokentievich; Legeche, Nikolai Leontievich; Golbinshtein, Alexanr Isovich; Reinsburg, Alexandr Mironovich; Burshtein, Mikhail Vladimirovich; Mikushin, Dmitry Pavlovich; Terskov, Alexei Danilovich; and Belov, Leonid Stepanovich, 3,730,283.

Milchem Incorporated: *See—*
Perricone, Alphonse C.; and Young, Homer F., 3,730,900.

Miles, Floyd D., to International Telephone and Telegraph Corporation. Vacuum switching system. 3,731,026, Cl. 200-144.00b.

Miller, Donald E., to Continental Can Company, Inc. Friction drive differential screw. 3,730,016, Cl. 74-424.80b.

Miller, Edward W.: *See—*
Keene, Derek K.; and Miller, Edward W., 3,730,369.

Miller, Gabriel Lorimer, to Bell Telephone Laboratories, Incorporated. Method and apparatus for analyzing semiconductors. 3,731,192, Cl. 324-158.00d.

Miller, Robert C., to Borg-Warner Corporation. Device for preventing contamination in hydrotherapy treatment system. 3,730,176, Cl. 128-66.000.

Miller, Robert N.: *See—*
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Millipore Corporation: *See—*
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Millmaster Onyx Corporation: *See—*
Shay, Edward G.; Wakeman, Reginald L.; and Petrocci, Alfonso N., 3,730,702.

Millprint, Inc.: *See—*
Newell, E. Strohm, 3,730,483.

Milly, George H., to Mining and Exploration, Company, mesne. Method of prospecting for mercury and associated noble and base metals. 3,730,683, Cl. 23-230.0ep.

Mina, Ramses R.: *See—*
Lenk, Pedro A.; Dunn, William C.; and Mina, Ramses R., 3,731,275.

Mine Safety Appliances Company: *See—*
Davison, Ellison L., 3,730,180.
Freilino, Ray S., 3,731,092.

Minemura, Kouichi, to Nippon Electric Company Limited. Thermally compensated ultrasonic light modulator. 3,730,609, Cl. 350-161.000.

Miner, Earl L., to Lawlor Industries Inc. Housing for a vehicle. 3,729,908, Cl. 56-16.700.

Mines de Potasse d'Alsace: *See—*
Mames, Michel; and Berthon, Robert, 3,730,341.

Minieri, Pasquale Paul, to Tenneco Chemicals, Inc. 4-(Substituted indazolyl-N'-methyl) hexamethylenetetraammonium halides. 3,730,954, Cl. 260-248.500.

Mining and Exploration, Company, mesne: *See—*
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Minneapolis Society of Fine Arts, The: *See—*
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Paczkowski, Sandra K., 3,730,522.

Minnesota Mining & Manufacturing Company: *See—*
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Minnesota Mining and Manufacturing Company: *See—*
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Minolta Camera Kabushiki Kaisha: *See—*
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Kobayashi, Tatsuo; and Ueda, Hiroshi, 3,730,063.

Minto, Horace G., to Bay Mechanical Company. Fluid distribution control device. 3,730,429, Cl. 236-94.000.

Misenheimer, Ernest Luther, III, to U.S. Plywood Champion Paper Inc. Furniture with assembly-disassembly feature. 3,730,601, Cl. 312-108.000.

Mitchell, John O.; Roberts, Spencer D.; and van Pelt, Richard W., to International Business Machines Corporation. Deceleration and stop-lock motor control apparatus. 3,731,176, Cl. 318-619.000.

Mitchell, John S., to Dow Chemical Company, The. Demountable optical tooling scale fixture. 3,730,470, Cl. 248-274.000.

Mitchell, Wallace F., to Ammco Tools Inc. Hydraulic brake system bleeder. 3,730,307, Cl. 188-352.000.

Mitrani, Moni S.: *See—*
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Mitsubishi Chemical Industries, Ltd.: *See—*
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Mitsubishi Jukogyo Kabushiki Kaisha: *See—*

Hayashi, Isao; and Kondo, Kenichiro, 3,730,486.

Mitsubishi Paper Mills, Ltd.: *See—*
Futaki, Kiyoshi; Emoto, Kazuhiro; and Tsukahara, Hirokazu, 3,730,712.

Mitsubishi Rayon Company Limited: *See—*
Kosaka, Kenzo; Adachi, Kiyoshi; Kitagawa, Hiroshi; Nakamura, Tunehiko; and Kato, Osami, 3,729,831.

Miyajima, Masayoshi: *See—*
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Miyake, Tokuaki: *See—*
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Miyamoto, Mitsugu, to Victor Company of Japan, Limited. Combination 4-channel 2-channel sterophonic endless cartridge tape player. 3,730,532, Cl. 274-4.00g.

Miyata, Yoshihiko; and Katoh, Noritada, to Hitachi, Ltd. Implosion-proof cathode-ray tube. 3,730,990, Cl. 178-7.800.

Mizoguchi, Sutemaru. Boring head. 3,730,636, Cl. 408-169.000.

Mizuno, Masaya: *See—*
Kono, Yoshinori; Iwasaki, Norio; Sato, Tosho; Mizuno, Masaya; and Takeuchi, Jikko, 3,730,975.

Mizutani, Nagao; and Nojima, Masamitsu, to Citizen Watch Co., Ltd. Starting device for a vibrating element for time measuring means. 3,731,167, Cl. 318-114.000.

Mobil Auto Crushers Corporation of America: *See—*
Flanagan, Robert L., 3,730,078.

Mobil Oil Corporation: *See—*
Heilweil, Israel J.; and Leavitt, Richard I., 3,730,894.

Mock, Norman M. Spatula. 3,730,579, Cl. 294-8.000.

Moeller, Richard E.: *See—*
Simoneau, Edward T.; Moeller, Richard E.; and Holdstock, Norman G., 3,730,931.

Moen, Alfred M. Single lever mixing valve. 3,730,222, Cl. 137-625.170.

Moga, Nicholas I.: *See—*
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Moisson-Franckhauser, Francois: *See—*
Aupoix, Marcel; and Moisson-Franckhauser, Francois, 3,730,966.

Molins Limited: *See—*
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Moller, Ake: *See—*
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Mollica, Richard J., Jr.; Hunter, Joseph E., Jr.; and Bladzik, Kenneth R., to General Motors Corporation. Method of producing stainless steel-low carbon steel composites. 3,729,805, Cl. 29-471.700.

Mollod, Leonard D., to International Telephone and Telegraph Corporation. Reduction of timing resolution in digital phase lock loops. 3,731,210, Cl. 328-155.000.

Monnerjahn, Walter. Gripper for unscrewing caps. 3,730,025, Cl. 81-3.400.

Monsanto Chemicals Limited: *See—*
Tripp, Terence Gordon, 3,730,857.

Monsanto Company: *See—*
Nunning, Walter J., 3,730,662.

Monsees, Claude E., to Wright Machinery Company, Inc. Article arranging and counting machine. 3,730,386, Cl. 221-7.000.

Montecatini Edison S.p.A. and: *See—*
de Varda, Giuseppe, 3,730,859.

Montgomery, Allen M.: *See—*
Gurganus, Thomas B.; Turnbull, Gordon K.; and Montgomery, Allen M., 3,729,971.

Montgomery, Lionel C., to Union Carbide Corporation. Boron nitride base evaporation vessel having a surface coating of titanium-silicon thereon. 3,730,507, Cl. 266-39.000.

Moody, Earl A., to Wagner Electric Corporation. Centrifugal governor. 3,731,024, Cl. 200-80.000.

Moore, Christopher John; and Barry, Brian, to United Kingdom of Great Britain and Northern Ireland, Secretary of State for Defence in Her Britannic Majesty's Government of the. Fan or compressor for a gas turbine engine. 3,730,639, Cl. 415-119.000.

Moore, Harrington. Convertible bird house and feeder. 3,730,139, Cl. 119-23.000.

Mor-Fish-Ent, Inc.: *See—*
Kahrs, James W.; and Osborn, Paul E., 3,730,142.

Morchand, Charles A., to Data-Plex Systems, Inc. Television transmission system for two classes of information. 3,730,986, Cl. 178-5.600.

Moreland, Fred E. Deep-sea dive suit and life support system. 3,730,178, Cl. 128-142.500.

Morency, Roger L.: *See—*
Johnson, Cameron D.; Mayer, Gerald M.; and Morency, Roger L., 3,729,980.

Morgan, Alfred Arthur, to Hawker Siddeley Aviation Limited. Aircraft with lift engines. 3,730,456, Cl. 244-12.00b.

Morgan Construction Company: *See—*
Wykes, Robert D., 3,729,973.

Morgan, James E., to PPG Industries, Inc. Process for preparing silica pigment. 3,730,749, Cl. 106-288.00b.

Morgenroth, Henri. Carburetor for automotive engines with a metering suction partly derived from a laminar air flow matrix. 3,730,496, Cl. 261-23.00a.

Morii, Kokichi: *See—*
Nakamura, Hideo; and Morii, Kokichi, 3,731,216.

Morisawa, Nobuo, to K.K. Morisawa Shashin Shokujiki Seisakusho. Photo-typesetting apparatus for musical notes. 3,730,062, Cl. 95-4.50r.

Morita, Katsumi, to Hakamada Kinzoku Kogyo Kabushiki Kaisha. Hard chrome plated vibrating board of an ultrasonic-wave washer. 3,730,489, Cl. 259-72.000.

Moriyasu, Hiro, to Tektronix, Inc. Transmission line circuit having common delay for two signal paths of opposite direction. 3,730,993, Cl. 178-59.000.

Morozov, Alexandr Nikolaevich: *See—*
Daiker, Artur Lvovich; Morozov, Alexandr Nikolaevich; Veis, Anatoly Ivanovich; Kushtuev, Boris Grigorievich; Novoselov, Nikolai Mikhailovich; Zhuravlev, Viktor Nikolaevich; Zinoviev, Alexei Fedorovich; Alfeev, Ivan Ivanovich; Nikitin, Viktor Ivanovich; Kocergin, Alexei Ilich; Matashkov, Vladimir Filippovich; Karelin, Nikolai Ivanovich; Volchematiev, Jury Venediktovich; Zaluzhentsev, Veniamin Fedorovich; and Morozov, Gennady Yakovlevich, 3,730,504.

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Morran, James R.: *See—*
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Morrice, Anthony Ronald Seaton. Trench shoring frame. 3,729,938, Cl. 61-41.00a.

Morris, Thomas M.: *See—*
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Morrison, David L.: *See—*
Cremeans, George E.; Berry, David A.; Rosenberg, Harvey S.; Genco, Joseph M.; and Morrison, David L., 3,730,833.

Morrison, Walter C., to Harris-Intertype Corporation. Method of reducing sound level of single facer machine. 3,730,803, Cl. 156-205.000.

Mosetich, Joseph: *See—*
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Mosetich, Ronald J.; and Mosetich, Joseph, to Fastener Corporation. Flexible nail strip and method of and apparatus for manufacturing the same. 3,729,885, Cl. 53-3.000.

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Schwendeman, Robert J.; D'Amico, Thomas V.; Petrakos, Nicholas; and Hagiwara, Shoji, 3,731,200.

Motzer, Alfred E.; and Zollinger, Henry, Jr., to Hobson and Motzer. Forming method and machine. 3,729,977, Cl. 72-405.000.

Moulds, John W.; and Storey, Edwin C., to General Motors Corporation. Pressure-inductance transducer. 3,730,146, Cl. 123-32.0ea.

Mouri, Katsuo: *See—*
Niimi , Masayasu; and Mouri, Katsuo, 3,730,982.

Moyer, Robert D. Load binder. 3,730,480, Cl. 254-71.000.

Moylan, Philip John, to Bell Telephone Laboratories, Incoporated. Programmable switching array. 3,731,073, Cl. 235-152.000.

MR Plastics and Coatings, Inc., mesne: *See—*
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Mueller, David Charles: *See—*
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Mueller, Fritz Kurt; Martin, Billy Otis; Chandler, James Parker; and Martin, Robert Cherry, to Royal Medical Corporation. Electronic, digital thermometer. 3,729,998, Cl. 73-362.0ar.

Mueller, Klaus P.: *See—*
Kreuter, Kenneth G.; and Mueller, Klaus P., 3,730,428.

Mueller, Kurt F.; and Cziesla, Manfred J., to United States of America, Navy. Monopropellant composition including hydroxylamine perchlorate. 3,730,789, Cl. 149-22.000.

Muka, Edward: *See—*
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Mullen, John H.; and Theby, Edward A., to McDonnell Douglas Corporation. Plasma heating torch. 3,731,047, Cl. 219-121.00p.

Muller, Peter R.: *See—*
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Munson, John C., to United States of America, Navy. Automatic rate tracker. 3,731,075, Cl. 235-181.000.

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Muramatu, Akira; and Endo, Tadao, to Omron Tateisi Electronics Co. Traffic signal control system. 3,731,271, Cl. 340-41.000.

Murase, Kenaki, to Starting Industrial Co., Ltd. Recoil starter. 3,730,162, Cl. 123-185.0ba.

Murphy, Bernard Thomas; and Panousis, Peter Theodore, to Bell Telephone Laboratories, Incorporated. Method of fabricating semiconductor integrated circuits using deposited doped oxides as a source of dopant impurities. 3,730,787, Cl. 148-175.000.

Murphy, Joseph C. Fishing reel with depth memory. 3,730,455, Cl. 242-84.10l.

Murphy, Robert A.: *See—*
Smith, Alfred H., Jr.; and Murphy, Robert A., 3,730,938.
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Myrland, Harold M.: *See—*
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Peterson, Reuben W., 3,731,102.
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Nadaguchi, Takeshi, to Matsushita Electric Industrial Co., Ltd. Switch with arc-prevention grooves between plat supported contacts. 3,731,016, Cl. 200-11.00r.
Nagai, Kiyoshi, to Tokyo Shibaura Electric Co., Ltd. Van-atta array antenna device. 3,731,313, Cl. 343-854.000.
Nagata, Masanori; and Osaki, Keisuke, to Omron Tateisi Electronics Co. System for preventing improper use of credit cards. 3,731,076, Cl. 235-61.70b.
Nagata, Osamu: *See—*
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McCord, Robert S.; Nail, Donald H.; and Sheratte, Martin B., 3,730,889.
McCord, Robert S.; Nail, Donald H.; and Sheratte, Martin B., 3,730,897.
Naito, Kenji; and Yasuda, Kiyoshi, to Takeda Chemical Industries, Ltd. Process for producing high molecular polyurethanes by reacting oxadiazinones with polyols in the presence of an organotin catalyst. 3,730,953, Cl. 260-77.5am.
Nakajima, Fumio: *See—*
Nikaido, Akira; Onda, Mitsuo; Nakajima, Fumio; Okano, Terutaka; Machida, Takayasu; Toida, Takashi; and Yanagawa, Yoshihiko, 3,731,125.
Nakamura, Hideo; and Morii, Kokichi, to Sony Corporation. Automatic gain control circuit. 3,731,216, Cl. 330-29.000.
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Nakamura, Toshimi; and Koide, Hiroyuki, to Mitsubishi Chemical Industries, Ltd. Apparatus for charging samples to analyzing apparatus. 3,730,364, Cl. 214-302.000.
Nakamura, Tunehiko: *See—*
Kosaka, Kenzo; Adachi, Kiyoshi; Kitagawa, Hiroshi; Nakamura, Tunehiko; and Kato, Osami, 3,729,831.
Nakane, Buhei. Decorative sheet material having plural adhesive layers. 3,730,825, Cl. 161-148.000.
Nakashima, Katsushi, to Aisin Seiki Company, Limited. Tandem master cylinder. 3,729,932, Cl. 60-54.60e.
Nakashima, Shinichi; Inoue, Morio; and Iwasa, Hitoo, to Matsushita Electronics Corporation. Method of making germanium semiconductor device. 3,730,800, Cl. 156-8.000.
Namon, Richard. Impedance related blood flow measuring device. 3,730,171, Cl. 128-2.05f.
Namy, Philippe, to Creusot-Loire. Roller pair type continuous casting apparatus. 3,730,254, Cl. 164-268.000.
Napoli, Louis Sebastian; and Hughes, John Joseph, to RCA Corporation. Frequency translator circuit. 3,731,180, Cl. 321-69.0nl.
Nardone, Prisco D.; Hollett, Ronald G.; and Warrick, James E., to Microdot Inc. Socket housing. 3,731,260, Cl. 339-127.00r.
National Cash Register Company, The: *See—*
Farber, Sheldon; and Wright, Arthur John, 3,730,754.
Lin, Chao-Han, 3,730,755.
National Forge Company: *See—*
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National Research Development Corporation: *See—*
Malet, Michael Anley; and Hills, David Leslie, 3,730,657.
Naunheim, Geraldine R., to Me Company. Stuffed, jointed doll with mirror face. 3,729,865, Cl. 46-116.000.
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Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Tkach, Khaim Berkovich; Nazarov, Nikolai Grigorievich; Malbert, Petr Eduardovich; Lavron, Nikolai Sergeevich; Alkasarov, Jury Innokentievich; Legeche, Nikolai Leontievich; Golbinshtein, Alexanr Isovich; Reinsburg, Alexandr Mironovich; Burshtein, Mikhail Vladimirovich; Mikushin, Dmitry Pavlovich; Terskov, Alexei Danilovich; and Belov, Leonid Stepanovich, 3,730,283.
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Nebel, Max Bruno; and Nebel, Erhard Max. Self supporting knitted lady's stocking. 3,729,956, Cl. 66-172.00e.
Nebout, Noel, to Dunlop Holdings Limited. Piston actuated control apparatus for a tyre building or shaping machine. 3,730,059, Cl. 92-140.000.
Neckermann Versand KGaA: *See—*
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Neet Products Incorporated: *See—*
Dunn, R. S.; and Rife, William J., 3,729,884.
Neff, Joseph J., to Bell & Howell Company. Information recording and replay methods and apparatus. 3,730,613, Cl. 352-72.000.
Neggers, Frank J.: *See—*
Picciano, Eugene A.; Clark, Francis C.; and Neggers, Frank J., 3,730,374.
Neidhart, Edward F.: *See—*
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Nelson, Charles R. Board game apparatus. 3,730,527, Cl. 273-131.0kn.
Nelson, Hersey B.: *See—*
Ambrose, Alwin W.; and Nelson, Hersey B., 3,729,797.
Nelson, Kenneth E., to Early California Industries, Inc. Fire retardant composition and method of production. 3,730,890, Cl. 252-7.000.
Nelson, Thomas W., to Omark Industries, Inc. Air relay valve. 3,730,226, Cl. 137-627.500.
Nesson, Israel; Palmer, Robert G.; Faris, Edwin E.; and Hertling, Charles J., to Berkey Photo, Inc. Device for use with self-developing film. 3,730,065, Cl. 95-13.000.
Neubert, Edeltraud, nee Preischl. Device for transporting and storing yarn bobbins having bobbin tubes. 3,730,340, Cl. 206-654.000.
Neubert, Gerhart, to Rheinstahl Wanheim Gesellschaft mit beschrankter Haftung. Apparatus for malting grain. 3,730,846, Cl. 195-129.000.
Neumeier, Leander A.; and Risbeck, John S., to United States of America, Interior. Method of improving creep-resistance of alloys. 3,730,781, Cl. 148-11.50r.
New Brunswick Scientific Co., Inc.: *See—*
Cohen, Stanley N.; and Tannenbaum, Myron, 3,730,352.
Newberger, Judah. Method for erasure drawing. 3,730,751, Cl. 117-11.000.
Newell, E. Strohm, to Millprint, Inc. Assembly for pulling a line. 3,730,483, Cl. 254-150.000.
Newtyle, Angus: *See—*
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NGK Insulators Ltd.: *See—*
Suzuki, Mikio, 3,730,345.
Nicol, James, to Air Reduction Company, Incorporated. Cryogenic system including hybrid superconductors. 3,730,967, Cl. 174-15.00c.
Niedrach, Leonard W., to General Electric Company. Carbon dioxide sensor. 3,730,868, Cl. 204-195.00p.
Nielsen, H., & Son Maskinfabrik A/S: *See—*
Ejlertsen, Bent, 3,729,798.
Nightengale, Charles D. Switch control means. 3,731,013, Cl. 200-4.000.
Niimi , Masayasu; and Mouri, Katsuo, to Hitachi, Ltd. Burst level detectors and phase detectors utilizing the same. 3,730,982, Cl. 178-5.4ck.
Nikaido, Akira; Onda, Mitsuo; Nakajima, Fumio; Okano, Terutaka; Machida, Takayasu; Toida, Takashi; and Yanagawa, Yoshihiko, to Citizen Watch Co., Ltd. Pulse motor for time piece. 3,731,125, Cl. 310-49.000.
Nikitin, Viktor Ivanovich: *See—*
Daiker, Artur Lvovich; Morozov, Alexandr Nikolaevich; Veis, Anatoly Ivanovich; Kushtuev, Boris Grigorievich; Novoselov, Nikolai Mikhailovich; Zhuravlev, Viktor Nikolaevich; Zinoviev, Alexei Fedorovich; Alfeev, Ivan Ivanovich; Nikitin, Viktor Ivanovich; Kocergin, Alexei Ilich; Matashkov, Vladimir Filippovich; Karelin, Nikolai Ivanovich; Volchematiev, Jury Venediktovich; Zaluzhentsev, Veniamin Fedorovich; and Morozov, Gennady Yakovlevich, 3,730,504.
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Nippon Electric Company Limited: *See—*
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Nippon Gakki Seizo Kabushiki Kaisha: *See—*
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Nippon Kakoh Seishi K.K.: *See—*
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Nippon Kokan Kabushiki Kaisha: *See—*
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Nippon Piston Ring Co., Ltd.: *See—*

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Nippon Telegraph and Telephone Public Corporation: *See—*
Tazaki, Kimio; Yamamoto, Hijime; Hinoshita, Shigehiko; and Hagiwara, Shoji, 3,731,199.

Nippon Toki Kabushiki Kaisha: *See—*
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Nippondenso Co., Ltd.: *See—*
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Nishimatsu, Shigeru; and Tokuyama, Takashi, to Hitachi, Ltd. Semiconductor device and a method of making the same. 3,730,766, Cl. 117-217.000.

Nishimoto, Akira, to Sansui Electric Co., Ltd. Protective device for loudspeaker. 3,731,153, Cl. 317-33.00r.

Nishimura, Noriyuki: *See—*
Chibata, Ichiro; Kakimoto, Toshio; Shibatani, Takeji; and Nishimura, Noriyuki, 3,730,838.

Nishio, Fumihiko: *See—*
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Nishizawa Shoji Co., Ltd.: *See—*
Kuroda, Minoru, 3,730,814.

Niskin, Shale J. Apparatus for sequentially deploying specimen collectors at selected depths in a body of water. 3,729,855, Cl. 43-8.000.

Nojima, Masamitsu: *See—*
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Norcross, Inc.: *See—*
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Nordson Corporation: *See—*
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Norris, Douglas C. Working of strip metal. 3,729,968, Cl. 72-129.000.

North American Aviation, Inc.: *See—*
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North American Philips Corporation: *See—*
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North American Rockwell Corporation: *See—*
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Northern Electric Company Limited: *See—*
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Northrop Corporation: *See—*
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Northwestern National Bank of Minneapolis: *See—*
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Norton Research Corporation (Canada) Limited: *See—*
Matchen, Ben; and Robertson, David, 3,730,826.
Matchen, Ben; Robertson, David; and Scott, John J., 3,730,827.

Norton, Robert K., to Harris-Intertype Corporation. Sheet conveyor apparatus and method. 3,730,517, Cl. 271-76.000.

Norwalk, Marshall H., to Airco, Inc. Electron beam furnace with material-evaporant equilibrium control. 3,730,962, Cl. 13-31.000.

Nospil Limited: *See—*
Dibrell, James W.; Pennington, James; and Schutz, Frank C., 3,730,399.

Novoselov, Nikolai Mikhailovich: *See—*
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Novotny, Charles J.: *See—*
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NSM Apparatebau GmbH: *See—*
Menke, Wilhelm, 3,731,066.

Nuese, Carlos: *See—*
Caspers, James W.; and Nuese, Carlos, 3,731,304.

Numakura, Toshihiko; and Yoshimatsu, Morio, to Sony Corporation. Recording and reproducing system for color video signal. 3,730,983, Cl. 178-5.4cd.

Nunning, Walter J., to Monsanto Company. Spinneret assembly. 3,730,662, Cl. 425-131.000.

N.V. Industrieele Handelscombinatie Holland: *See—*
van der Gaag, Cornelis, 3,730,402.

Oba, Yoichi; Kato, Hachioji; Tsunoda, Tokorozawa Teruo; Fujiki, Yokyo Shun; and Tsukuni, Hitachi Hajime, to Hitachi, Ltd. and Hitachi Chemical Company, Ltd. Synthetic detergent compositions. 3,730,913, Cl. 252-541.000.

O'Bannon, Richard M. Open cylindrical can contents ejecting device. 3,730,391, Cl. 222-82.000.

Oberg, Gustave A., to Ronson Corporation. Motor speed control mechanism for domestic blender. 3,730,490, Cl. 259-108.000.

O'Brien, William P.: *See—*
Richards, Reynald B.; O'Brien, William P.; and Cannon, Peter, 3,730,796.

Occhipinti, Carl, to Bunker Ramo Corporation. Electrical connector. 3,731,259, Cl. 339-66.00m.

Ochi, Toshio: *See—*
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Odec Computer Systems, Inc.: *See—*
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Odom, Clyde H.; and Kunselman, Maurice H., to United States of America, Atomic Energy Commission. Apparatus for leaching core material from sheared segments of clad nuclear fuel pins. 3,730,689, Cl. 23-269.000.

Odum, William T.; Elkins, James H.; and Coggins, Thomas M., to United States of America, Navy. Salvage pontoon. 3,730,122, Cl. 114-53.000.

Oehlers, Kenneth J.: *See—*
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Oelschlaeger, George Frederick, to Deere & Company. Implement frame. 3,730,280, Cl. 172-581.000.

Ogawa, Tokuo; Sakano, Tatsumi; and Okamura, Shigeyoshi. Disc brake including vibration dampening means. 3,730,302, Cl. 188-73.500.

Ogawa, Yasuhide; Kawase, Yutaka; Takada, Makoto; and Fujioka, Hideki, to Nippon Electric Company, Limited. Electron beam welding apparatus. 3,731,052, Cl. 219-121.0eb.

Ogden Engineering Corporation: *See—*
Ogden, Ralph, Sr.; Colley, John G.; and Neidhart, Edward F. (said Colley, said Neidhart, and said Johnson assors. to), 3,731,048.

Ogden, Ralph, Sr.; Colley, John G.; and Neidhart, Edward F., said Colley, said Neidhart, and said Johnson assors. to Ogden Engineering Corporation. Air cooled welding gun. 3,731,048, Cl. 219-130.000.

O'Hara, Mark J.: *See—*
Gleim, William K. T.; Gatsis, John G.; and O'Hara, Mark J., 3,730,875.

Ohosawa, Hiroshi: *See—*
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Ohsawa, Hiroshi: *See—*
Komatsu, Kenichi; Saijo, Akira; Haneda, Katsuji; Kodaira, Ryoji; and Ohsawa, Hiroshi, 3,730,836.

Ohta, Wasaburo, to Kabushiki Kaisha Ricoh. Electrostatic imaging employing a dot electrode. 3,730,710, Cl. 96-1.00r.

Ohta, Yasuo: *See—*
Tsuneta, Asahide; Ohta, Yasuo; and Ikegaki, Makoto, 3,731,129.

Oji, Sukeo. Container random access storage system. 3,730,358, Cl. 214-16.40a.

Oka, Toshio; and Kawanishi, Zenzaburo. Golf swing training attachment. 3,730,530, Cl. 273-186.00a.

Okada, Jujiro. Screw with a head looking like a true circle. 3,730,048, Cl. 85-45.000.

Okada, Takeshi: *See—*
Fukami, Masaharu; and Okada, Takeshi, 3,730,175.

Okada, Toshihiko, to Osaka Transformer Co., Ltd. Consumable electrode arc welding machine. 3,730,136, Cl. 118-78.000.

Okamura, Shigeyoshi: *See—*
Ogawa, Tokuo; Sakano, Tatsumi; and Okamura, Shigeyoshi, 3,730,302.

Okano, Terutaka: *See—*
Nikaido, Akira; Onda, Mitsuo; Nakajima, Fumio; Okano, Terutaka; Machida, Takayasu; Toida, Takashi; and Yanagawa, Yoshihiko, 3,731,125.

Oldford, William G.: *See—*
Giampalmi, John J., Jr.; and Oldford, William G., 3,730,347.

Olin Corporation: *See—*
Andrew, Eugene A., 3,730,049.
Middleton, Verne L., 3,729,804.
Vandebeek, Willard F., 3,731,078.

Olinkraft, Inc.: *See—*
Lawson, De Wayne L., 3,730,417.

Olivares, Ismael Adolfo; Bean, Frederic Roland; and Haist, Grant Milford, to Eastman Kodak Company. Photographic element comprising an aliphatic carboxylic acid aryl hydrazide and ascorbic acid. 3,730,727, Cl. 96-95.000.

Oliver, Kenneth L., to Sperry Rand Corporation. Load cell for aircraft control stick. 3,729,990, Cl. 73-133.000.

Olivetti, Ing. C., & C., S.p.A.: *See—*
Fedrigo, Renzo, 3,730,039.

Olsen, Robert W., to Construction Specialties, Inc. Decorative open-work panel structure. 3,729,891, Cl. 52-663.000.

Olson, LeRoy E., and Patrickus, Sylvester A.: *See—*
Lucas, William H.; and Jones, Kenneth G., 3,729,886.

Olympus Optical Co., Ltd.: *See—*
Fukami, Masaharu; and Okada, Takeshi, 3,730,175.

O'Malley, John J., to General Motors Corporation. Power transmission. 3,730,022, Cl. 74-759.000.

Omark Industries, Inc.: *See—*
Nelson, Thomas W., 3,730,226.

O'Meara, Thomas R., to Hughes Aircraft Company. Adaptive arrays. 3,731,103, Cl. 250-199.000.

Omron Tateisi Electronics Co.: *See—*
Muramatu, Akira; and Endo, Tadao, 3,731,271.
Nagata, Masanori; and Osaki, Keisuke, 3,731,076.

Onda, Mitsuo: *See—*
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Ondrey, John A.: *See—*
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Ono, Hisatake; and Watarai, Syu, to Fuji Photo Film Co., Ltd. Photoconductive material for electrophotography. 3,730,711, Cl. 96-1.500.

Ono, Takyuki: *See—*
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Ono, Yoshiaki: *See—*
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Oohira, Takeshi: *See—*
Inuzuka, Isao; Watanabe, Akinori; and Oohira, Takeshi, 3,731,166.

Oppenlaender, Knut; Liebold, Gert; and Buettner, Egon, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Crude oil demulsifiers. 3,730,906, Cl. 252-342.000.

Opti-Holding AG: *See—*
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Oratronics, Inc.: *See—*
Linkow, Leonard I.; Weiss, Charles M.; Weiss, Lillian Bishop; and Liwerant, Abram, 3,729,825.

Oravitz, James L., Jr.: *See—*
Dahlberg, John R.; Oravitz, James L., Jr.; and Michalik, Edmund R., 3,730,408.

Orendi, Roderich. Drill press. 3,730,635, Cl. 408-46.000.

Orloff, Frank D.: *See—*
Whitney, Theodore R., 3,730,985.

Orr, William Harold: *See—*
Cuthbert, John David; Hensler, Donald Henry; and Orr, William Harold, 3,730,720.

Ort, Wolfgang: *See—*
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Ory, Gaston C. Twisting machine. 3,731,033, Cl. 219-7.500.

Orzelek, Frank J.: *See—*
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Osheroff, Gene W., to Fluidtech Corporation. Thermovalve. 3,730,430, Cl. 236-101.000.

Ostrander, George K.: *See—*
Wixson, Donald F.; and Ostrander, George K., 3,730,259.

Otavka, Michael Andrew: *See—*
Strauss, Bruce Paul; and Otavka, Michael Andrew, 3,730,075.

Otto, Dennis L., to Timken Company, The. Method of removing a bearing seal assembly. 3,729,789, Cl. 29-148.40s.

Otto, Dr. C., & Comp. G.m.b.H.: *See—*
Pries, Eriche E.; and Rossow, Rolf, 3,730,847.

Otto, Lloyd W. Axe sharpening device. 3,730,023, Cl. 78-82.000.

Outboard Marine Corporation: *See—*
Brown, Peter W., 3,730,149.
Dahl, Einar S.; and Kidd, Earl H., 3,729,911.

Ovitron Research Corporation: *See—*
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Owens-Corning Fiberglas Corporation: *See—*
Marzocchi, Alfred, 3,730,759.
Varrasso, Eugene C., 3,730,695.

Ozawa, Akio, to Pioneer Electronic Corporation. Protective circuit. 3,731,151, Cl. 317-27.00r.

Pace, Robert E.: *See—*
Seely, John Leland; Cohen, Leo; Colino, Ronald P.; and Pace, Robert E., 3,731,287.

Paczkowski, Sandra K., to Minneapolis Society of Fine Arts, The. Children's rocking and climbing toy. 3,730,522, Cl. 272-60.000.

Page, John S., Jr. Van conversion to camper vehicle. 3,730,580, Cl. 296-23.00r.

Palitex Project-Company GmbH: *See—*
Franzen, Gustav; Nimtz, Klaus; and Riefers, Horst, 3,730,447.

Palmer, George W.: *See—*
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Palmer, Robert G.: *See—*
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Parer, David George: *See—*
Bossons, Walter Howard; Parer, David George; and Burcher, George Davey, 3,730,356.

Park, Raymond E.; and Escoubas, Thomas A. Tractor jack. 3,730,482, Cl. 254-124.

Park-Ohio Industries, Inc.: *See—*
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Parker, John A.: *See—*
Riccitiello, Salvatore R.; and Parker, John A., 3,730,891.

Parker, Norman W., to Motorola, Inc. Color signal recording and decoding. 3,730,976, Cl. 178-5.4cd.

Parker-Jones, H. Andre: *See—*
Bachle, Wilfred H.; Segovia, Gilbert; and Parker-Jones, H. Andre, 3,730,564.

Parkinson, Charles F., to General Motors Corporation. Vehicle pocket arrangement. 3,730,581, Cl. 296-37.00r.

Parkison, Richard G. Single nozzle fluid device. 3,730,439, Cl. 239-590.300.

Parkison, Richard G., to American Standard, Inc. Laminar-flow spout-end devices. 3,730,440, Cl. 239-590.500.

Pashin, Vasily Fedorovich: *See—*
Maksutov, Rafkhat; Asfandiyarov, Khalim Akhmetovich; Pashin, Vasily Fedorovich; Gubarev, Yakov Fedorovich; Sadykov, Rifgat Suleimanovich; Akhunov, Albert Musagitovich; Vakhitov, Gadel Galyautdinovich; Graifer, Valery Isaakovich; Zyalyaev, Vagiz Murzakhanovch; Kostrjukov, Gennady Vasilievich; and Efanov, Boris Fedorovich, 3,729,803.

Passons, William Erby; and Reese, William R. Method and apparatus for tufting uniform cut pile. 3,730,115, Cl. 112-79.00r.

Patashnik, Max; and Keyes, Mark C., to United States of America, Interior. Animal food from raw whole fish. 3,730,728, Cl. 99-3.000.

Patterson-Kelley Co. Inc., The: *See—*
Clark, John A., Jr., 3,730,261.

Pattillo, William Clifford, to Southern Saw Service, Inc. Double-cut reversible plate. 3,730,444, Cl. 241-82.500.

Paulun, Manfred: *See—*
Blachut, Theodore J.; Paulun, Manfred; Ferry, Kirk; and Amaro, Angel Garcia, 3,729,830.

Pause, Carl W.: *See—*
Weisfeld, Lewis B.; and Pause, Carl W., 3,730,943.

Pause, Kurt; and Buzga, Heinrich, to Maschinenfabrik Buckau R. Wolf AG. Method and apparatus for separating water from a mixture of a granular material and water. 3,730,343, Cl. 210-68.000.

Pause, Kurt, to Maschinenfabrik Buckau R. Wolf Aktiengesellschaft. Centrifuge construction. 3,730,768, Cl. 127-19.000.

Payne, Bobby R.: *See—*
Wenneborg, William Z.; Bunnelle, Philip R.; and Payne, Bobby R., 3,730,592.

Peabody Galion Corporation: *See—*
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Peace, Charles R.: *See—*
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Pearl, David R.: *See—*
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Pearson, Alan John: *See—*
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Peck, William L.: *See—*
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Pedersen, Charles A., to Rothmans of Pall Mall Canada Limited. Propeller throttling device for boats. 3,730,127, Cl. 114-145.00a.

Pedersen, Herbert C.: *See—*
Rice, Alvin S.; Pedersen, Herbert C.; and Iverson, Vincent L., 3,730,640.

Pedersen, Reuben L. Rear window defroster. 3,730,070, Cl. 98-2.040.

Peil, William; and Hesler, Joseph P., to General Electric Company. Amplifier of controllable gain. 3,731,215, Cl. 330-29.000.

Pelavin, Joseph Y., to Lark Luggage Corporation. Luggage construction. 3,730,308, Cl. 190-41.000.

Penhollow, John O., to Esso Production Research Company. Seismic exploration using the common reflection point technique. 3,731,270, Cl. 340-15.5cp.

Pennington, James: *See—*
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Penny Enterprises, Ltd.: *See—*
Akin, Minnie Izetta, 3,730,321.

Penton, James R., to Varian Associates. Sample introduction system for a fluid chromatograph. 3,730,002, Cl. 73-422.0gc.

Pepi, Jerome S., to Wright, Barry, Corporation. Pneumatic self positioning shock and vibration isolation stabilizing absorber. 3,730,473, Cl. 248-358.00r.

Perga, Martin W.: *See—*
De Palma, Ted V.; and Perga, Martin W., 3,729,936.

Perlman, Richard J., to J.M.R. Enterprises, Inc. Sitz bath. 3,729,748, Cl. 4-6.000.

Perminov, Evgeny Mikhailovich. Carriage for drawing devices. 3,729,827, Cl. 33-79.00r.

Perner, Johannes Jurgen: *See—*
Disch, Karlheinz; Krings, Peter; Kuhling, Dieter; Bellinger, Horst; and Perner, Johannes Jurgen, 3,730,902.
Perricone, Alphonse C.; and Young, Homer F., to Milchem Incorporated. Composition and process for drilling subterranean wells. 3,730,900, Cl. 252-8.50c.
Perry, Richard Anthony, to Odec Computer Systems, Inc. Impact line printer. 3,730,082, Cl. 101-93.00c.
Pet Incorporated: *See—*
Baruzzini, Gino L., 3,729,889.
Peters, Donald L.: *See—*
Dunn, Lloyd G.; Morran, James R.; and Peters, Donald L., 3,730,383.
Peters, Willard L. Money spray apparatus for theft identification. 3,730,110, Cl. 109-25.000.
Peterson, Dean M., to Honeywell Inc. Quench control calculator. 3,730,064, Cl. 95-10.00c.
Peterson, Kenneth E.: *See—*
Block, Forest E.; and Peterson, Kenneth E., 3,730,029.
Peterson, Reuben W.; Backus, Harold A.; and Anderson, Clifford J., to N L Industries, Inc. Shipping container for radioactive material. 3,731,101, Cl. 250-108.00r.
Peterson, Reuben W., to N L Industries, Inc. Shipping container for radioactive material. 3,731,102, Cl. 250-108.00r.
Peterson, William D., to Weyher Construction Company. Self-tilting trowel for concrete. 3,729,765, Cl. 15-235.800.
Petit, Pierre, to L'Air Liquide Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Process for separation of ternary gaseous mixtures by rectification. 3,729,943, Cl. 62-22.000.
Petrakos, Nicholas: *See—*
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Petrie, James Alexander; and Bracey, Kenneth Edward George, to United Kingdom of Great Britain and Northern Ireland, Minister of Technology in Her Britannic Majesty's Government of the. Fan. 3,729,957, Cl. 60-226.00r.
Petro, James: *See—*
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Pettibone Corporation: *See—*
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Pfeuffer, Alfred; Kalkhof, Gustav; Weber, Helmut; and Ludtke, Arnold, to Messer Griesheim G.m.b.H. Method of transporting and positioning continuous casting butts. 3,730,780, Cl. 148-9.000.
Pfizer Inc.: *See—*
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Philco-Ford Corporation: *See—*
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Iadicicco, Robert A.; and Wolfe, Paul G., 3,731,135.
Phillips, David T.: *See—*
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Phillips Petroleum Company: *See—*
Gall, James W., 3,730,271.
Kelley, Carl S.; and Thorn, Frank H., 3,729,944.
Kodis, Rudolfs, 3,730,230.
Louthan, Rector P., 3,730,850.
McCarthy, William C.; and De Lano, Merritt V., Jr., 3,730,690.
Myers, John W., 3,730,958.
Neer, Harold M., 3,731,302.
Reed, Edwin E.; and Kleinmann, Earl E., 3,730,375.
Warner, Paul F., 3,730,339.
Williams, Keith A., 3,730,858.
Wright, Roy F., 3,730,934.
Piagnoli, Aldo. Milk kettle, for domestic use. 3,730,403, Cl. 222-572.000.
Picciano, Eugene A.; Clark, Francis C.; and Neggers, Frank J., to Warner-Lambert Company. Insulated container. 3,730,374, Cl. 220-9.00f.
Pickard, John E.; and Weber, Charles H., III, to Grace, W. R., & Co. Magnetic sheet for impression cylinder. 3,730,092, Cl. 101-415.100.
Pickert, Lynn I., to General Signal Corporation. Variable load brake control apparatus. 3,730,597, Cl. 303-22.00a.
Piechocki, Benjamin, to Western Electric Company, Incorporated. Compensating base for lead-frame bonding. 3,729,810, Cl. 29-493.000.
Piedmont Engineering and Machine Company, Inc.: *See—*
Christian, Donald K.; and Lomax, Dennis L., 3,729,958.
Piepho, Robert R., to Babcock & Wilcox Company, The. Pulverizing apparatus. 3,730,446, Cl. 241-110.000.
Pierce, John Robinson, to Bell Telephone Laboratories, Incorporated. Interconnector loop data block transmission. 3,731,002, Cl. 179-15.0al.
Pike, Herbert J.: *See—*
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Pilipovich, Donald; and Weber, John Q., to North American Aviation, Inc. Ethyldecaborane or B_2H_6 with mixed ClF_3 oxidizer. 3,730,793, Cl. 149-22.000.
Pilz, William M., III, to Container Corporation of America. Self-locking, double wall container. 3,730,416, Cl. 229-16.00a.
Pinckaers, B. Hubert, to Honneywell Inc. Condition controlled reversible motor system. 3,731,173, Cl. 318-471.000.
Pioneer Electronic Corporation: *See—*
Iwasaki, Tadahisa, 3,730,996.
Konno, Akira, 3,730,997.
Ozawa, Akio, 3,731,151.
Saeki, Yoshifumi, 3,731,115.
Shimizu, Takehiro, 3,730,988.
Pipes, George R., to Eaton Corporation. Material handling system. 3,730,102, Cl. 104-48.000.
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Pitney Bowes-Alpex, Inc.: *See—*
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McFiggans, Robert B., 3,731,293.
Tramposch, Herbert, 3,730,084.
Zucker, Frederic E., 3,731,065.
Pittman, Paul F., to Westinghouse Electric Corporation. Insulation test apparatus of the high frequency voltage discharge type with improved switching arrangement to initiate discharge. 3,731,185, Cl. 324-54.000.
Plasko, Emil Robert; Kohl, James Allen; and Hutchison, Michael Raymond, to Micro Devices Corporation. Thermal limiter constructions. 3,731,248, Cl. 337-208.000.
Plastic Forming Company, Inc., The: *See—*
Schurman, Peter T., 3,730,576.
Plastics Manufacturing Company: *See—*
Meiser, Kenneth D., 3,730,828.
Plessey Handel und Investments AG: *See—*
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Plumb, Frank J.: *See—*
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Pointu, Pierre; and Tran, Trach Lan, to Compagnie de Saint-Gobain. Method and apparatus for gas phase ion interchange in solids. 3,730,696, Cl. 65-30.000.
Polaroid Corporation: *See—*
Bird, George R.; and Rosenoff, Alan E., 3,730,714.
Eloranta, Vaito K., 3,731,080.
Idelson, Elbert M., 3,730,725.
Land, Edwin H.; Bloom, Stanley M.; and Farney, Leonard C., 3,730,716.
Land, Edwin H.; and Bachelder, Albert J., 3,731,083.
Poliak, Richard M.; and Rauch, Leslie D., to International Business Machines Corporation. Non-activated soldering flux. 3,730,782, Cl. 148-23.000.
Polistina, Rocco Albert: *See—*
Forgione, Peter Salvatore; and Polistina, Rocco Albert, 3,730,841.
Pollitzer, Ernest L., to Universal Oil Products Company. Hydrocarbon conversion catalyst. 3,730,878, Cl. 208-143.000.
Polytube Inc.: *See—*
Ledewitz, William; and Twigg, Robert W., 3,730,393.
Pompei, Jean; and Guiochon, Paul, to U.S. Philips Corporation. Cathode sputtering etching device with movable guard ring. 3,730,873, Cl. 204-298.000.
Poor, John Gove; and Rynne, George Bernard, to Conversion Chemical Corporation. Method and composition for electroplating zinc. 3,730,855, Cl. 204-55.
Popovitsch, Ernst, to Nagele, Karl F., Dr., Feinmaschinenbau. Apparatus for manufacturing a continuous stringer for a sliding clasp fastener. 3,729,800, Cl. 29-207.50r.
Porsche, Dr.-Ing, H.c.F., K.G., Firma: *See—*
Porsche, Ferdinand Anton Ernst, 3,731,079.
Porsche, Ferdinand Anton Ernst, to Porsche, Dr.-Ing, H.c.F., K.G., Firma. Swingable headlight for vehicles. 3,731,079, Cl. 240-7.10h.
Porter, H. K., Company, Inc.: *See—*
Spiringer, Arthur James, 3,730,310.
Porth, Karl A., to Ski boot buckle. . 3,729,779, Cl. 24-68.0sk.
Potter, Patrick. Chimneys. 3,730,073, Cl. 98-60.000.
Pounds, Thomas W.: *See—*
Chao, Junn-Ling; Wicks, Moye, III; and Pounds, Thomas W., 3,729,987.
PPG Industries, Inc.: *See—*
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Drummond, Warren W., 3,730,813.
Kapalko, Erwin J.; and English, William H., 3,730,865.
Morgan, James E., 3,730,749.
Seymour, Samuel L., 3,730,697.
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Precision Sampling Corporation: *See—*
Harris, Rano J., Sr.; and Harris, Rano J., Jr., 3,730,389.
Presnick, Michael C. Inflatable insulation for packaging. 3,730,240, Cl. 150-2.500.
Preston, Edward George, to Molins Limited. Cut-off devices for continuous rod-making machines. 3,730,034, Cl. 83-38.000.
Preston, Mark, to Litton Business Systems, Inc. Arc suppressor for dielectric apparatus. 3,731,105, Cl. 250-217.00r.
Previati, Augusto, to Industrie Pirelli S.p.A. Curing apparatus for elongate elastomeric articles. 3,730,675, Cl. 432-60.000.
Prewitt, Cecil H.: *See—*
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Prewitt, Cecil H., to Skinner, Cortland, Glaze, Cecil K. and Prewitt, Cecil H. Skimming system. 3,730,346, Cl. 210-242.000.
Price, Ira Emmet. Sawing machine. 3,730,042, Cl. 83-471.300.
Price, Robert B.; and Stager, Francis W., to Jacobs Manufacturing Company, The. Gear drive assembly for anti-wheel lock-up control systems in motor vehicles. 3,730,006, Cl. 74-13.000.
Prichard, Harry A., Jr. Unitized metal-stud concrete form structure. 3,730,476, Cl. 249-191.000.
Pries, Eriche E.; and Rossow, Rolf, to Otto, Dr. C., & Comp. G.m.b.H. Plural gas mains for independently operating low and high burners in alternative flue. 3,730,847, Cl. 202-139.000.
Prior, Josef, to Dynamit Nobel Aktiengesellschaft. Detonating fuse. 3,730,096, Cl. 102-27.00r.
Prisk, Bert C.; Erickson, Raymond Kenneth; and Wheatley, Marion E., to General Motors Corporation. Heat sealing die. 3,730,812, Cl. 156-380.000.
Prisk, Orford W., to Weber, Martin. Outlet valve for liquid supply receptacle. 3,730,224, Cl. 137-625.330.
Procor Limited: *See—*
Deeks, Ronald G., 3,730,200.
Procter & Gamble Company, The: *See—*
Franz, Norman J., 3,730,798.
Prohaska, Charles Anton, to Du Pont de Nemours, E. I., and Company. Computer controlled method of titration. 3,730,685, Cl. 23-230.00r.
Prokop, Josef F., to International Harvester Company. Shift mechanism for mechanical transmissions. 3,730,010, Cl. 74-477.000.
Proof Lock International Inc.: *See—*
Hsu, Sam Shiao-Ming, 3,729,964.
Propach, Otto; Veittinger, Heinz; and Jauch, Karl, to Zahnradfabrik Friedrichshafen Aktiengesellschaft. Groove forming cold rolling tool. 3,729,970, Cl. 72-208.000.
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Lusk, Harold B.; Cooke, Herbert E.; and Pryor, Leon D., 3,729,916.
Pryor, Michael J.: *See—*
Caule, Elmer J.; Sperry, Philip R.; Pryor, Michael J.; and Ford, James, 3,730,779.
Pullman Incorporated: *See—*
Aquino, Herman A.; and Knippel, Willis H., 3,730,360.
Tamborski, Robert S., 3,730,106.
Pulman, Leonard J.: *See—*
Fekete, Frank; and Pulman, Leonard J., 3,730,808.
Pultorak, Donald Chester: *See—*
Hernqvist, Karl Gerhard; and Pultorak, Donald Chester, 3,730,606.
Purdue Research Foundation: *See—*
Gilham, (, Peter Thomas; and Weith, Herbert Lee, 3,730,844.
Purrer, Josef, to Maschinenfabrik Fahr AG. Reversible transmission, especially for field harvesters. 3,730,037, Cl. 83-68.000.
Purser, Kenneth H., to Radiation Dynamics, Inc. Particle acceleration tube having improved beam focus control. 3,731,211, Cl. 328-233.000.
Quik, Willem C. J.,; and van Weeren, Pieter A., to Shell Oil Company. Process for the preparation of base oils for the production of lubricating oil. 3,730,877, Cl. 208-143.000.
Quinlan, Joseph B., to United States of America, Army. Energetic protective coating for caseless ammunition. 3,730,094, Cl. 102-38.000.
Quintilian, Bartholomew F.; and Williams, Robert J. W., to Koppers Company, Inc. Method for installing multiples of dust collector plates. 3,729,815, Cl. 29-592.000.
Rabian, Laszlo: *See—*
Ullmann, Werner; Panschow, Rudolf; Shur, Volker; Meyer, Wolfgang; Sieg, Arno; and Rabian, Laszlo, 3,731,043.
Ullmann, Werner; Rabian, Laszlo; Mattei, Silvano; Sieg, Arno; Suter, Peter; Tadini, Costantino; Panschow, Rudolf; Suhr, Volker; and Meyer, Wolfgang, 3,731,044.
Ullmann, Werner; Rabian, Laszlo; Mattei, Silvano; Sieg, Arno; Suter, Peter; Tadini, Costantino; Panschow, Rudolf; Suhr, Volker; and Meyer, Wolfgang, 3,731,045.
Radecke, Helmut, to Bosch, Robert, Fernsehanlagen GmbH. Horizontal aperture correction with variable characteristic. 3,730,987, Cl. 178-7.100.
Rademaker, Leo C., to General Electric Company. Adjustable high voltage power supply with output polarity switching. 3,731,179, Cl. 321-15.000.
Radiation Dynamics, Inc.: *See—*
Purser, Kenneth H., 3,731,211.
Raffenberg, Hermann-Josef, to BASF Wyandotte Corporation. Apparatus for continuously producing tubular bodies of foamed material. 3,730,660, Cl. 425-122.000.
Raleigh, Ronald George: *See—*
Gilman, Paul Brewster, Jr.; Raleigh, Ronald George; and Koszelak, Thaddeus Donald, 3,730,723.
Ramacciotti, Aldo; Praitoni, Alberto; and Imberti, Bruno, to Centro Sperimentale Metallurgico S.p.A. Double delivery lance for refining the steel in the converter processes. 3,730,505, Cl. 266-34.001.
Ramme, Hans Joachim. Tank containers. 3,730,384, Cl. 220-71.000.
Ramun, Michael: *See—*
Marian, Daniel; and Ramun, Michael, 3,730,508.
Ramwell, Peter W.: *See—*
Leeper, Harold M.; and Ramwell, Peter W., 3,730,835.
Randell, Donald Alan: *See—*
Kunda, Wasyl; and Randell, Donald Alan, 3,730,756.
Ransburg Electro-Coating Corporation: *See—*
Scharfenberger, James A., 3,730,433.
Rapistan Incorporated: *See—*
De Good, Maynard J., 3,730,330.
Rappleyea, Frederick A., to Cougar, Inc. Protective helmet for football or the like. 3,729,744, Cl. 2-3.00r.
Rash, Caroline M. Orthopedic sling. 3,730,164, Cl. 128-94.000.
Rash, Kenneth E., Jr.; Colmey, John C.; and Zanzig, Charles E., to Foremost-McKesson, Inc. Confection and method of manufacture. 3,730,735, Cl. 99-134.00r.
Rath, Heinrich Bernhard, to Girling Limited. Disc brake caliper and circuit system. 3,730,306, Cl. 188-345.000.
Raths, Fred W.: *See—*
Buckman, John D.; Raths, Fred W.; Boggs, Pamela P.; and Donerson, Robert L., 3,730,888.
Ratti, Ferruccio, to Steiner Company Lausanne S.A. Dispensing apparatus. 3,730,409, Cl. 225-14.000.
Rauch, Constantin: *See—*
Sirek, Tomas, 3,730,206.
Rauch, Leslie D.: *See—*
Poliak, Richard M.; and Rauch, Leslie D., 3,730,782.
Ray, James D., to Trailer hitching coupler. . 3,730,559, Cl. 280-513.000.
Rayfield, Harry F., to Terminal Data Corporation. Retrieval code. 3,731,276, Cl. 340-146.30z.
Raymond, Robert E., to International Basic Economy Corporation. Heat exchanger apparatus for hydraulic system. 3,730,260, Cl. 165-27.000.
Raytheon Company: *See—*
Foreman, Robert J., 3,731,137.
RCA Corporation: *See—*
Buttle, Robert Leroy; and Bailey, William Douglas, 3,730,969.
de Bruyne, Pieter, 3,731,317.
Gehweiler, William Frederick, 3,731,114.
Hernqvist, Karl Gerhard; and Pultorak, Donald Chester, 3,730,606.
Klein, Norman Sam, 3,731,160.
Law, Harold Bell, 3,730,719.
Napoli, Louis Sebastian; and Hughes, John Joseph, 3,731,180.
Sanford, Robert Fincher, 3,730,991.
Reece, Robert L. High pressure fluid control valve. 3,730,223, Cl. 137-625.230.
Reed, Edwin E.; and Kleinmann, Earl E., to Phillips Petroleum Company. Fluid containment system. 3,730,375, Cl. 220-9.0lg.
Reese, William R.: *See—*
Passons, William Erby; and Reese, William R., 3,730,115.
Reeve, Paul H.: *See—*
Colgan, Francis E.; and Reeve, Paul H., 3,730,297.
Reeves, Robert E., to Inland Container Corporation. Apparatus for forming containers. 3,729,887, Cl. 53-194.000.
Reichhold-Albert-Chemie Aktiengesellschaft: *See—*
Gildenpfennig, Rolf, 3,730,926.
Reilly, John J., Jr., to Binary Systems, Inc. Optical card reader drive. 3,731,062, Cl. 235-61.11e.
Reimer, William A.: *See—*
Krylow, Konstanty E.; and Reimer, William A., 3,730,264.
Reimer, William A., to GTE Automatic Electric Laboratories, Incorporated. Printed wiring card guide shelf and method for manufacture thereof. 3,731,157, Cl. 317-101.0dh.
Reinfeld, Kurt; and Gauye, Emmanuel V., to Koppers Company, Inc. Apparatus for bending continuous cast slabs. 3,730,256, Cl. 164-282.000.
Reinsburg, Alexandr Mironovich: *See—*
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Tkach, Khaim Berkovich; Nazarov, Nikolai Grigorievich; Malbert, Petr Eduardovich; Lavron, Nikolai Sergeevich; Alkasarov, Jury Innokentievich; Legeche, Nikolai Leontievich; Golbinshtein, Alexanr Isovich; Reinsburg, Alexandr Mironovich; Burshtein, Mikhail Vladimirovich; Mikushin, Dmitry Pavlovich; Terskov, Alexei Danilovich; and Belov, Leonid Stepanovich, 3,730,283.
Reisch, Franz S., to Honeywell Inc. Illuminated indicator for high and low ambient light environments. 3,731,077, Cl. 240-1.0el.
Renfro, James C.: *See—*
Dunn, James L., Jr.; Renfro, James C.; and Goode, John V., 3,731,297.
Reno, William H.: *See—*
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Rentzepis, Peter Michael, to Bell Telephone Laboratories, Incorporated. Time resolved spectrometer. 3,730,629, Cl. 356-74.000.
Republic Rubber Industries (Proprietary) Limited: *See—*
Martin, Aubrey Wilfred, 3,730,801.

Research Corporation: *See—*
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Research Engineering Company: *See—*
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Reynolds, Donald W.: *See—*
Heck, Burnette; and Reynolds, Donald W., 3,730,301.
Reynolds, R. J., Tobacco Company: *See—*
Rhode, Wilmer A., 3,730,189.
Reynolds, Verne J. Sew-in urethral catheter. 3,730,187, Cl. 128-349.00r.
Rha, Chokyun: *See—*
Teng, James; Rha, Chokyun; Scallet, Barry L.; and Stubits, Marcella C., 3,730,693.
Rhee, Dong Woo, to GTE Sylvania Incorporated. Television horizontal transistor oscillator and AFC network. 3,730,989, Cl. 178-7.50r.
Rheinstahl Wanheim Gesellschaft mit beschrankter Haftung: *See—*
Neubert, Gerhart, 3,730,846.
Schultz, Rolf, 3,730,845.
Rhode, Wilmer A., to Reynolds, R. J., Tobacco Company. Tobacco product. 3,730,189, Cl. 131-17.00r.
Rhodes, Peter: *See—*
Franek, Jozef Tadeusz; and Rhodes, Peter, 3,730,381.
Rhone-Poulenc S.A.: *See—*
Xavier, Marze, 3,730,872.
Riccitiello, Salvatore R.; and Parker, John A. Intumescent composition, foamed product prepared therewith, and process for making same. 3,730,891, Cl. 252-8.100.
Rice, Alvin S.; Pedersen, Herbert C.; and Iverson, Vincent L., to United Aircraft Corporation. Seal ring for gas turbine. 3,730,640, Cl. 415-117.000.
Rich, John P.: *See—*
Stirk, Sidney E.; Rich, John P.; and Holt, Russell E., 3,730,079.
Richard, David D. Ice fishing apparatus for signalling the biting of a fish. 3,729,849, Cl. 43-17.000.
Richard, Robert, to Aktiengesellschaft Brown, Boveri & Cie. Shock absorbing mountings for apparatus. 3,730,463, Cl. 248-22.000.
Richards, George B., to Fluid Device Corporation. Liquid level control system and carbonator. 3,730,500, Cl. 261-140.000.
Richards, Reynald B.: *See—*
Richards, Reynald B.; O'Brien, William P.; and Cannon, Peter (said O'Brien and said Cannon assor. to said), 3,730,796.
Richards, Reynald B.; O'Brien, William P.; and Cannon, Peter, said O'Brien and said Cannon assor. to said Richards, Reynald B. Building construction and method of manufacture. 3,730,796, Cl. 156-173.000.
Richardson, Edwin A.; and Scheuerman, Ronald F., to Shell Oil Company. Plugging solution precipitation time control. 3,730,272, Cl. 166-294.000.
Richardson, Frederick Denys: *See—*
Richardson, Frederick Denys; and Rogers, Philip Sydney, 3,730,698.
Richardson, Frederick Denys; and Rogers, Philip Sydney, to Metallurgic Hobken-Overpelt, RST International Metals, Limited and Richardson, Frederick Denys. Sealing of joints in refractory devices with silicate coating. 3,730,698, Cl. 65-43.000.
Richardson, Harry L., to Chemical Construction. Removal of entrained matter from gas streams. 3,729,898, Cl. 55-7.000.
Richardson, Robert, to Brunswick Corporation. Bowling ball, bag and shoe rack. 3,730,241, Cl. 150-52.00a.
Richter, Ulf, to Dynamit Nobel AG. Composite for explosive bonding. 3,730,415, Cl. 228-3.000.
Ride-Rite Corporation: *See—*
Thaxton, Ellis B., 3,730,548.
Thaxton, Ellis B., 3,730,550.
Rider, Miles I.: *See—*
Whitney, Theodore R., 3,730,985.
Riefers, Horst: *See—*
Franzen, Gustav; Nimtz, Klaus; and Riefers, Horst, 3,730,447.
Rieker, Justus, Messrs. Dr.,: *See—*
Stelzer, Werner, 3,729,842.
Rife, William J.: *See—*
Dunn, R. S.; and Rife, William J., 3,729,884.
Rigby, Francis Lloyd, to Haas, John I., Inc. Stable and emulsifiable hop extract. 3,730,730, Cl. 99-50.500.
Riley-Beaird, Inc., mesne: *See—*
Kowalski, Valentine Walter, 3,730,848.
Risbeck, John S.: *See—*
Neumeier, Leander A.; and Risbeck, John S., 3,730,781.
Rising, Donald B.: *See—*
Trasen, Ben; and Rising, Donald B., 3,730,353.
Ritt Laboratories, Inc.: *See—*
Clark, John E., 3,731,197.
Rittenbach, Otto E., to United States of America, Army. Operating proximate radars with interlaced spectral lines. 3,731,310, Cl. 343-17.10r.
Ritter, Gerhard: *See—*
Ritter, Klaus; Gott, Hans; Ritter, Gerhard; and Ritter, Josef, 3,731,042.
Ritter, Herman O.; and Weber, Karl, to Singer Company, The, mesne. Even feeding attachment for sewing machines. 3,730,117, Cl. 112-212.000.
Ritter, Josef: *See—*
Ritter, Klaus; Gott, Hans; Ritter, Gerhard; and Ritter, Josef, 3,731,042.
Ritter, Klaus; Gott, Hans; Ritter, Gerhard; and Ritter, Josef, to EVG Entwicklungs- und verwertungsgesellschaft m.b.H. Welding machine for manufacture of wire mesh. 3,731,042, Cl. 213-62-3--.
Rively, Clair M.; and Petro, James, to Westinghouse Electric Corporation. Method and apparatus for manufacturing beaded filament-coil components for electric lamps. 3,729,787, Cl. 29-25.180.
Rixson-Firemark, Inc.: *See—*
Crane, Burke J.; D'Hooge, Richard E.; and Roberts, Frank D., 3,729,771.
Roberts, Bruce W.: *See—*
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Roberts, Frank D.: *See—*
Crane, Burke J.; D'Hooge, Richard E.; and Roberts, Frank D., 3,729,771.
Roberts, George Wavell, to Gravoki Systems Limited. Fluid pressure devices. 3,730,652, Cl. 417-568.0C0.
Roberts, John A.; Roberts, Peter R.; and Danzey, Lee B., to Brunswick Corporation. Orifice structure. 3,730,227, Cl. 138-40.000.
Roberts, Peter R.: *See—*
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Roberts, Spencer D.: *See—*
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Robertshaw Controls Company: *See—*
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Kreuter, Kenneth G.; and Mueller, Klaus P., 3,730,428.
Willson, James R., 3,731,059.
Robertson, David: *See—*
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Robertson, John H.: *See—*
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Robie's Machineworks, Inc.: *See—*
Stearns, George H., 3,730,113.
Robinson, Norman F.: *See—*
Hanback, Francis J.; and Robinson, Norman F., 3,730,563.
Rochelle, William R.: *See—*
Ward, Delbert R.; and Rochelle, William R., 3,730,537.
Rochelle, William R., to Brown & Root, Inc. Method and apparatus for laying pipeline. 3,729,941, Cl. 61-72.300.
Rockefeller, George D., Jr., to Westinghouse Electric Corporation. Impedance distance relay. 3,731,152, Cl. 317-27.00r.
Rodriguez, Juan A.: *See—*
Laatt, Richard G.; and Rodriguez, Juan A., 3,731,208.
Rogers, Lloyd W., Jr.: *See—*
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Rogers, Philip Sydney: *See—*
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Rogers, Walter Clark, Jr.; and Hoffman, Frank D., Jr., to Royal Development Company, Inc. Rocker recliner chair. 3,730,585, Cl. 297-85.000.
Rohde, Wilhelm: *See—*
Helfgenl, Werner; and Rohde, Wilhelm, 3,730,097.
Rohn, Donald M. Adjustable truck wrench support. 3,730,027, Cl. 81-180.00r.
Rohr Corporation: *See—*
Macdonald, Howard R., 3,730,292.
Rohr Industries, Inc.: *See—*
Gregory, Gerrett W., 3,729,801.
Maison, Richard L., 3,730,311.
Vawter, Verne E.; and Fernandez, Richard E., 3,729,809.
Rolls-Royce Limited: *See—*
Jubb, Albert, 3,730,644.
Williams, David Eyre, 3,729,930.
Rondeau, Roger E., to United States of America, Air Force. Spectral separation and analysis of isomeric azoxybenzenes. 3,730,687, Cl. 23-230.00r.
Ronson Corporation: *See—*
Oberg, Gustave A., 3,730,490.
Rood, William E., Jr.: *See—*
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Rooker, Bobbie E.: *See—*
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Roper, Ralph E., to Wallace Expanding Machines, Inc. Method for forming metal wheels. 3,729,795, Cl. 29-159.010.
Rosecrans, Charles E. Toilet facility. 3,729,749, Cl. 4-113.000.
Rosemount Engineering Company, Limited: *See—*
Johnston, James Stewart, 3,731,072.
Rosenbaum, Erik; and Klimchak, Edward George, to Bendix Corporation, The. Electrically controlled resistive weights. 3,731,122, Cl. 307-264.000.
Rosenberg, Harvey S.: *See—*
Cremeans, George E.; Berry, David A.; Rosenberg, Harvey S.; Genco, Joseph M.; and Morrison, David L., 3,730,833.
Rosenberger, Dieter; and Hermann, Alfred, to Siemens Aktiengesellschaft. Gas laser. 3,731,227, Cl. 331-94.500.
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Roslin Corporation: *See—*
Rost, Karl H., 3,730,385.

Roslin, Victor Oscar, to Northern Electric Company Limited. Inductor bobbin with terminals. 3,731,245, Cl. 336-192.000.

Ross, Robert H.: *See—*
Rosso, John B.; and Ross, Robert H., 3,731,091.

Ross, William Campbell, to Grace, W. R., & Co. Compressible vehicle tire. 3,730,244, Cl. 152-323.000.

Ross, William Campbell, to Grace, W. R., & Co. Method of producing a novel compressible rool. 3,730,794, Cl. 156-112.000.

Rossmy, Gerd: *See—*
Koerner, Gotz; and Rossmy, Gerd, 3,730,905.

Rosso, John B.; and Ross, Robert H. Method and means for monitoring the quanity of dispersed oil in water with means for wiping the sample cell. 3,731,091, Cl. 250-43.50r.

Rossow, Rolf: *See—*
Pries, Eriche E.; and Rossow, Rolf, 3,730,847.

Rost, Karl H., to Roslin Corporation. Nestable container. 3,730,385, Cl. 220-97.00c.

Roth, Eric Michael. Brush handling adjustment. 3,729,762, Cl. 15-144.00b.

Rothmans of Pall Mall Canada Limited: *See—*
Pedersen, Charles A., 3,730,127.

Rottmann, Hans R.: *See—*
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Rousselot, Felix, to Ciba-Geigy Corporation. Ejection device for multiple-product dispensers. 3,730,437, Cl. 239-306.000.

Roussin, Alfred G., to General Electric Company. Cylindrical electrode system for focusing and deflecting an electron beam. 3,731,136, Cl. 315-16.000.

Routson, Willis G.: *See—*
Katzer, Melvin F.; and Routson, Willis G., 3,730,203.

Rowen, William I., to General Electric Company. Torque control system for a gas turbine. 3,729,928, Cl. 60-39.28p.

Rox-Lederwarenfabriken Hamann KG: *See—*
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Royal Brass Manufacturing Company, The: *See—*
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Royal Development Company, Inc.: *See—*
Rogers, Walter Clark, Jr.; and Hoffman, Frank D., Jr., 3,730,585.

Royal Medical Corporation: *See—*
Mueller, Fritz Kurt; Martin, Billy Otis; Chandler, James Parker; and Martin, Robert Cherry, 3,729,998.

Royer, Dennis J.: *See—*
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RST International Metals, Limited: *See—*
Richardson, Frederick Denys; and Rogers, Philip Sydney, 3,730,698.

Rubio, Manuel Jesus, to Barrera, Roberto Gonzalez and Hermosa, Victor. Tortilla and process using water soluble alkaline substance. 3,730,732, Cl. 99-80.00r.

Runtz, Jean W., to North American Philips Corporation. Multi-position switch with improved wafer switch contact arrangement. 3,731,017, Cl. 200-11.00d.

Russell, Winfield P. Combination pack and cot. 3,730,407, Cl. 224-9.000.

Rustan, B., A/S: *See—*
Rustan, Birger, 3,730,745.

Rustan, Birger, to Rustan, B., A/S. Method for casting of plaster products. 3,730,745, Cl. 106-110.000.

Rydberg, Sverker, to System Research Inc. Non-return valves. 3,730,218, Cl. 137-535.000.

Rynne, George Bernard: *See—*
Poor, John Gove; and Rynne, George Bernard, 3,730,855.

Sack, John J.; and Acs, Steven, to Allied Chemical Corporation. Irreversible energy absorbing air bag system. 3,730,551, Cl. 280-150.0ab.

Sadel, Hans. Radio frequency measurements. 3,731,186, Cl. 324-57.00n.

Sadykov, Rifgat Suleimanovich: *See—*
Maksutov, Rafkhat; Asfandiyarov, Khalim Akhmetovich; Pashin, Vasily Fedorovich; Gubarev, Yakov Fedorovich; Sadykov, Rifgat Suleimanovich; Akhunov, Albert Musagitovich; Vakhitov, Gadel Galyautdinovich; Graifer, Valery Isaakovich; Zyalyaev, Vagiz Murzakhanovch; Kostrjukov, Gennady Vasilievich; and Efanov, Boris Fedorovich, 3,729,803.

Saeki, Yoshifumi, to Pioneer Electronic Corporation. Voltage memory circuit. 3,731,115, Cl. 307-238.000.

Saijo, Akira: *See—*
Komatsu, Kenichi; Saijo, Akira; Haneda, Katsuji; Kodaira, Ryoji; and Ohsawa, Hiroshi, 3,730,836.

Sakano, Tatsumi: *See—*
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Salinari, Richard V., to Norcross, Inc. Explandable novelty device. 3,730,818, Cl. 161-17.000.

Sallot, Georges, to Societe des Procedes Modernes d'Injection Sopromi. Fuel injection device for internal combustion engines. 3,730,159, Cl. 123-136.000.

Salvi, Joseph: *See—*
Lichtman, Jerome; and Salvi, Joseph, 3,729,992.

Samander, Asib S.: *See—*
Beaty, Thomas, Jr.; and Samander, Asib S., 3,730,357.

Sampson, Robert W.: *See—*
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Sandell, Torsten Wilhelm, to Fabriksaktiebobaget Eka. Endless flexible abrasive belt having soldered seams and a method for making such seams. 3,729,873, Cl. 51-399.000.

Sanders Associates, Inc.: *See—*
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Wild, Norman R.; and Leavy, Paul M., Jr., 3,731,225.

Sanders, William R.: *See—*
Bouchard, Richard J.; and Sanders, William R., 3,731,299.

Sandoz-Wander, Inc.: *See—*
King, William R., 3,730,225.

Sanford, Robert Fincher, to RCA Corporation. Grounded faceplate kinescope system. 3,730,991, Cl. 178-7.50d.

Sansui Electric Co., Ltd.: *See—*
Nishimoto, Akira, 3,731,153.

Sarto, Jorma O., to Chrysler Corporation. Exhaust gas recycling. 3,730,156, Cl. 123-119.00a.

Sasaki, Soji, to Hitachi, Ltd. Holographic imaging system by ultrasound. 3,731,265, Cl. 340-5.00h.

Satama, Kauko K. Lure releasing device. 3,729,854, Cl. 43-17.300.

Satas, Wallace J.; and Konkel, Joseph, to Data Printer Corporation. Ribbon rewinding apparatus especially for high speed printers. 3,730,449, Cl. 242-57.100.

Sato, Tosho: *See—*
Kono, Yoshinori; Iwasaki, Norio; Sato, Tosho; Mizuno, Masaya; and Takeuchi, Jikko, 3,730,975.

Satterfield, Richard Alan, to Northrop Corporation. Peak voltage detector circuit. 3,731,209, Cl. 328-151.000.

Saunders, Eldon John. Vehicle trailer sway control system. 3,730,554, Cl. 280-406.00a.

Saunders, John; and Casper, Clarence, Jr., to United Aircraft Corporation. Active double tuned band pass filter. 3,731,218, Cl. 330-178.000.

Sawdon, Edwin G., to BTM Corporation. Fluid operated apparatus. 3,730,044, Cl. 83-513.000.

Sawhney, Harbans Lal: *See—*
Sloane, Ivan Henry; Mailhot, Armand Ludovic; Beliveau, Roger Louis; and Sawhney, Harbans Lal, 3,729,917.

Sayers, Leslie W.; Barnes, Jeffery W.; and Jackson, Norman, to Courtaulds Limited. Novelty textile yarns. 3,729,920, Cl. 57-144.000.

Scallet, Barry L.: *See—*
Teng, James; Rha, Chokyun; Scallet, Barry L.; and Stubits, Marcella C., 3,730,693.

Scanlon, Thomas Albert, to Avid Corporation. Stethoscope. 3,730,290, Cl. 181-24.000.

Scannell, Jack W., to Collins Radio Company. Method for metallic pattern definition. 3,730,799, Cl. 156-5.000.

Scarpellino, Anthony J., Jr.: *See—*
McKee, Douglas W.; and Scarpellino, Anthony J., Jr., 3,730,774.

Schack, Warren R.; and Connick, Francis Glenn, to Swift & Company. Shaped and formed meat products manufacture. 3,730,740, Cl. 99-187.000.

Schaff, Ulrich: *See—*
Eichmann, Dieter; Heyer, Gunter; Schaff, Ulrich; and Voigt, Gunter, 3,731,120.

Schaffer, William J.: *See—*
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Schantz, Spencer C., to U.S. Controls Corporation. Electrical switch with contact wiping. 3,731,032, Cl. 200-164.00r.

Scharfenberger, James A., to Ransburg Electro-Coating Corporation. Improvements in and relating to the coating of articles. 3,730,433, Cl. 239-15.000.

Scheidweiler, Andreas; and Muller, Peter R., to Cerberus AG. Ionization fire alarm with wind screen. 3,731,093, Cl. 250-44.000.

Schenk, Walter; and Hovemann, Friedrich, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Stabilized aqueous solutions of unsaturated aliphatic sulfonic acids or salts thereof. 3,730,854, Cl. 204-49.000.

Scherenberg, Hans O., to Daimler-Benz Aktiengesellschaft. Motor vehicle. 3,730,300, Cl. 188-5.000.

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Schippers, Heinz; Lenk, Erich; and Streppel, Herbert, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Winding machines with pivotable rail-guided toggle traversing rod guides. 3,730,448, Cl. 242-43.100.

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Schloemann Aktiengesellschaft: *See—*
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Schloetter, Dr.-Ing. Max, Fabrik fuer Galvanotechnik: *See—*
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Schloss, Hans R., to Sun Chemical Corporation. Polyurethane adhesives and coating compositions. 3,730,927, Cl. 260-29.2tn.

Schlosser, Peter: *See—*
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Schlottmann, Roy Otto; and Yadon, Paul Edward. Method for dry packing of surfaces. 3,730,763, Cl. 117-104.00r.

Schluter, Wilhelm, to Hoesch Aktiengesellschaft. Hydraulic drive for a turning connection with balls. 3,730,055, Cl. 91-498.000.

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Schmidt, Gunther; Theiss, Armin; Dederra, Carl-Helmut; and Kaiser, Leonnard, to Bolkow Gesellschaft mit beschrankter Haftung. Method of constructing a fluid cooled combustion chamber. 3,729,793, Cl. 29-157.00c.

Schmidt, William G.; Gabbard, Ova G.; Husted, John M.; Maillet, Wilfrid G.; and Bos, Marinus A., to Communications Satellite Corporation. TDMA satellite communications system with an aperture window for adquisition. 3,730,998, Cl. 179-15.0bs.

Schmitt, Arthur J.; and Spaeth, Lloyd H., to West Bend Company, The. Portable humidifier. 3,730,497, Cl. 261-24.000.

Schmitt, Dieter; Stein, Alfred; and Baumer, Wilhelm, to Merck Patent Gesellschaft mit beschrankter Haftung. Indicator for the detection of nickel ions. 3,730,688, Cl. 23-253.0tp.

Schmoock, Roy F.: *See—*
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Schnell, Georg: *See—*
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Schopp, Lloyd W., to United States of America, Navy. Controlled descent system. 3,730,099, Cl. 102-35.600.

Schouw, Arthur C., to Commute Air, Inc. Surface effect vehicle. 3,730,298, Cl. 180-126.000.

Schramayr, Ernst, to Ideal Equipment Co., Ltd. Holder for collars and the like garment parts. 3,730,116, Cl. 112-121.150.

Schramayr, Ernst; and Geisinger, Wolfgang. Apparatus for forming fabric blanks. 3,730,404, Cl. 223-38.000.

Schuierer, Manfred, to Bruckner-Apparatebau Michelstadt GmbH. Process for wet treatment and subsequent drying of a textile web. 3,730,679, Cl. 8-151.000.

Schultz, Edward G., Jr., to Avco Corporation. Low spin arming fuze for autorotating munitions. 3,730,101, Cl. 102-79.000.

Schultz, Rolf, to Rheinstahl Wanheim Gesellschaft mit beschrankter Haftung. Installation for producing malt. 3,730,845, Cl. 195-129.000.

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Schwartz, Herman, to Pitney Bowes-Sage, Inc. Electrophotographic copy paper supply roll and mounting assembly therefor. 3,730,452, Cl. 242-68.400.

Schwartz, Ralph E., to Ovitron Research Corporation. Method for preserving comestibles. 3,729,948, Cl. 62-64.000.

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Schwendtner, Manfred, to Siemens Aktiengesellschaft. Switching circuit for measuring the electrical power in two energy flow directions (delivered and returned). 3,731,190, Cl. 324-142.000.

Schwind, Eduard; and Schlosser, Peter, to Gesellschaft fur Kernforschung m.b.H. Method for the continuous separation of plutonium from uranium in the two-phase system by means of electrolytic reduction. 3,730,851, Cl. 204-1.500.

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Scott, William P.; and Woods, Warren W., to Continental Oil Company. Low temperature greases. 3,730,896, Cl. 252-28.000.

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Sedlacek, Friedrich; and Korpiun, Joachim, to Schloetter, Dr.-Ing. Max, Fabrik fuer Galvanotechnik. Electroplating bath for depositing tin-lead alloy plates. 3,730,853, Cl. 204-43.000.

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Selden, Boynton. Collapsible lapboard structure. 3,730,077, Cl. 108-43.000.

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Senda, Osamu, to Industrial Science & Technology, Agency of. Apparatus for accurate determination of absolute density of a fluid. 3,729,982, Cl. 73-32.000.

Sequeira, Avilino, Jr., to Texaco Inc. Production of naphthenic oils. 3,730,876, Cl. 208-59.000.

Seymour, Samuel L., to PPG Industries, Inc. Method of supporting glass sheets with tongs for heat treating. 3,730,697, Cl. 65-105.000.

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Shaffer, William E., to Stromberg-Carlson Corporation. Current limiting and resistance monitoring circuit. 3,731,012, Cl. 179-175.300.

Shane, Hugh J. S.; Schill, John E.; and Lilley, John W., to Hart Chemical Limited. Process of production of defoamer compositions. 3,730,907, Cl. 252-358.000.

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Shannon, John Martin; and Kerr, John Anthony, to U.S. Philips Corporation. Methods of manufacturing a semiconductor device. 3,730,778, Cl. 148-1.500.

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Shanok, Victor; and Shanok, Jesse P., to Glass Laboratories Company. Magneto-responsive composite molding. 3,730,577, Cl. 292-251.500.

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Sharpless, Samuel H. Bowling lane vacuum cleaner. 3,729,769, Cl. 15-347.000.

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Sheahan, Robert E.; and Plumb, Frank J., to J-B-T Instruments, Inc. Safety reversing switch. 3,731,023, Cl. 200-78.000.

Shearman, Paul M., to Metalized Ceramics Corporation. Laminated coil. 3,731,005, Cl. 179-100.20c.

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Sheleg, Boris, to United States of America, Navy. Circular array with Butler submatrices. 3,731,315, Cl. 343-854.000.

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Shields, George Edward. Adjustable drapery support with two means of vertical adjustment. 3,730,469, Cl. 248-265.000.

Shilton, Brian Roger; and Byron, Donald John, to Clayton Dewandre Company Limited. Boosted hydraulic systems. 3,729,931, Cl. 60-54.50p.

Shimizu, Soichiro. Device for sealing water at coupling portion of tunnel tubes. 3,729,939, Cl. 61-43.000.

Shimizu, Takehiro, to Pioneer Electronic Corporation. Electronic transmission system of static picture writings. 3,730,988, Cl. 178-6.800.

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Silver, Francis M., to Fraze, Ermal C. Can end with inseparable tear strip and latch means for holding tear strip against can wall. 3,730,380, Cl. 220-54.000.

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Silverstone, Calvin Eric; and Surrall, Alan John, to Leland Gas Turbines Limited. Rubbing seal for a rotary regenerative heat exchanger. 3,730,538, Cl. 277-96.00r.

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Smith, Geoffrey Allan; and Laidlaw, Alan James, 1/3 to Dawson, Joseph, (Holdings) Limited. Dye transferring method. 3,730,676, Cl. 8-2.500.

Smith, Harry A.; and Rooker, Bobbie E., to Dow Chemical Company, The. Aziridine-β-propiolactone adhesives. 3,730,807, Cl. 2-16-73.

Smith, Horace L., Jr., to Smitherm Industries, Inc. Roasting method for particulate solids. 3,730,731, Cl. 99-68.000.

Smith, Howard John Leonard, to Dzus Fastener Co., Inc. Friction locks. 3,730,243, Cl. 151-41.500.

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Spadoni, Frank G., Jr., to Litton Systems, Inc. Electrical connector with twisted posts. 3,731,261, Cl. 339-220.00r.
Spaeth, Lloyd H.: *See—*
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Spearhead, Inc.: *See—*
Hardway, Edward V., Jr., 3,729,991.
Spectrotherm Corporation: *See—*
Hunt, Robert P., 3,731,098.
Spence, Larry A. Orally operated electronic musical instrument. 3,730,046, Cl. 84-1.040.
Spencer, Donald J.; Durran, Donald A.; and Bixler, Henry A., to United States of America, Air Force. Tunable optical cavity for chemical laser. 3,731,221, Cl. 331-94.500.
Spencer, William C., to American Science & Engineering Inc. Living materials shipping system. 3,730,418, Cl. 229-27.00r.
Sperry, Philip R.: *See—*
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Oliver, Kenneth L., 3,729,990.
Waldrop, Thomas W.; Wagstaff, Robert A.; and Weinlader, Joseph K., 3,730,441.
Spicer, Lyndon Reginald, to International Standard Electric Corporation. Underwater connection. 3,731,258, Cl. 339-48.000.
Spiess, Helmit. Apparatus for feeding sheets of paper. 3,730,515, Cl. 271-46.000.
Spira, Joel S.; and Licata, Joseph, to Lutron Electronics Co., Inc. High-frequency fluorescent tube lighting circuit with isolating transformer. 3,731,142, Cl. 315-94.000.
Spira, Nathan, to Controls Bailey Societe Anonyme. Transfer checking device for analog data acquisition system. 3,731,296, Cl. 340-248.00a.
Spiringer, Arthur James, to Porter, H. K., Company, Inc. Current conductor rail. 3,730,310, Cl. 191-29.0dm.
Spisak, Raymond J.; Becker, Robert N.; and McKeithan, Wesley L., to Westinghouse Electric Corporation. Disconnecting switch operating linkage. 3,731,018, Cl. 200-48.00r.
St. Amand, James C., to General Motors Corporation. Canister for evaporation loss control. 3,730,158, Cl. 123-136.000.
Stackman, Robert W.: *See—*
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Stager, Francis W.: *See—*
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Stanford Technology Corporation: *See—*
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Staphex Corporation: *See—*
Brubaker, Robert D.; and Brown, Blanchard W., 3,730,682.
Stark, Robert E., to Gates Rubber Company, The. Separator for electrochemical cells and process of making same. 3,730,772, Cl. 136-30.000.
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Staubli Ltd.: *See—*
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Stauffer Chemical Company: *See—*
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Stefko, Paul L., Jr.: *See—*
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Stehle, Peter Fallon; Dickstein, Jack; and Loshaek, Samuel, to Borden, Inc. Stable vinyl acetate N-methylolacrylamide latex with fully-hydrolyzed polyvinyl alcohol. 3,730,933, Cl. 260-29.6wb.
Stein, Alfred: *See—*
Schmitt, Dieter; Stein, Alfred; and Baumer, Wilhelm, 3,730,688.
Stein, Leonard, to General Electric Company. Method of providing polycrystalline silicon regions in monolithic integrated circuits. 3,730,765, Cl. 117-212.000.
Steiner Company Lausanne S.A.: *See—*
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Steisslinger, Kurt: *See—*
Ettischer, Helmut; Ort, Wolfgang; Simon, Horst; and Steisslinger, Kurt, 3,730,066.
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Stenographic Machines, Inc.: *See—*
Eldridge, Brice; Davy, Christopher G.; and Michals, Richard A., 3,731,278.
Stephens, William I.: *See—*
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Sterilplast S.p.A.: *See—*
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Sterlini, Jacques, to Societe Anonyme: Compagnie Electro-Mecanique. Method and apparatus for intimately contacting a gas and a liquid. 3,730,494, Cl. 261-21.000.
Sternco Industries, Inc.: *See—*
Suchowski, Bernard, 3,730,138.
Steudler, Frederick W., Jr., to Vallorbs Jewel Company, The. Quick connect-disconnect coupler. 3,730,565, Cl. 285-158.000.
Stevens, J. P., & Co., Inc.: *See—*
Mazzone, Charles P.; and Pike, Herbert J., 3,729,784.
Stevens, Samuel S. Adjustable slice for cylindrical roll former. 3,730,831, Cl. 162-321.000.
Stewart, David Bruce; Newtyle, Angus; Main, John; Kettins, Angus; and Duncan, Maurice, to Stewart, Wm. R., & Sons (Hacklemakers) Limited. Method of fixing pins in a matrix. 3,730,802, Cl. 156-98.000.
Stewart, Troy L.: *See—*
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Stewart, Wm. R., & Sons (Hacklemakers) Limited: *See—*
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Stines, Harvey F.: *See—*
Marckx, Edward I.; and Stines, Harvey F., 3,730,032.
Stirk, Sidney E.; Rich, John P.; and Holt, Russell E., to Improved Machinery Inc. Variable nip press having rolls maintained on parallel axes. 3,730,079, Cl. 100-170.000.
Stockhausen, Cyril J.: *See—*
Ventriglio, Frank J.; Zall, David M.; Stockhausen, Cyril J.; and Decker, Donald R., Jr., 3,729,902.
Stockton, Thomas R., to Ford Motor Company. Inline transmission for high speed engines. 3,730,021, Cl. 74-759.000.
Stoffey, Donald G.; and Lee, Henry L., Jr., to Lee Pharmaceuticals. Certain low viscosity thermosetting acrylic resins and their use as binders in dental filling compositions. 3,730,947, Cl. 260-47.0va.
Stohler, John L.: *See—*
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Stohlquist, Roger H., to Anderson Bros. Mfg. Co. Method and apparatus for wrapping articles. 3,729,894, Cl. 53-28.000.

Stone, John M., to Copolymer Rubber & Chemical Corporation. Method and apparatus for controlling reaction rate. 3,730,928, Cl. 260-29.70r.

Stone, Raymond E.; and Wing, Aubrey E., to Industrial Construction Co., Inc. Control system for a waste wood burner. 3,730,114, Cl. 110-18.00r.

Storage Technology Corporation: *See—*
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Strand, Leon D.: *See—*
United States of America, National Aeronautics and Space Administration, 3,729,935.

Strang, Aart; and Talens, Bernard R., to Shell Oil Company. Ashless anti-rust additives. 3,730,485, Cl. 257-57.000.

Strauss, Bruce Paul; and Otavka, Michael Andrew. Percolator. 3,730,075, Cl. 99-310.000.

Streander, George W., to Design Systems, Inc. Angle gauge. 3,730,631, Cl. 356-150.000.

Streel, Dominique Thomas Francois, to Cockerill-Ougree-Providence et Esperance Longdoz en abrege "Cockerill". Process for treating a coating of aluminium deposited on a metal support, more particularly, sheet metal. 3,730,783, Cl. 148-6.300.

Streiffert, John G.; and Muka, Edward, to Eastman Kodak Company. Device for selectively reproducing sound on one of a plurality of tracks. 3,731,006, Cl. 179-100.2md.

Streppel, Herbert: *See—*
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Striegler, John H., to Atlantic Richfield Company. Drilling tool and bearing system. 3,730,284, Cl. 175-92.000.

Strier, Murray P.: *See—*
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Strifler, Paul E., to Daimler-Benz Aktiengesellschaft. Brake installation for electrically driven vehicles. 3,731,168, Cl. 318-139.000.

Stroh, Alvin L. Adjustable shelving structure. 3,730,108, Cl. 108-10.000.

Stroh, Bernhard, to Cordeurop Establishment Vaduz. Non-rotating rope with spiral strands. 3,729,921, Cl. 57-145.000.

Strohl, Ronald Irwin: *See—*
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Stromberg-Carlson Corporation: *See—*
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Shaffer, William E., 3,730,999.
Shaffer, William E., 3,731,012.

Strommer, Palmer K., to General Mills, Inc. Continuously puffing finely-divided particulate food materials utilizing opposing steam forces. 3,730,729, Cl. 99-26.000.

Strong, Colin Barry: *See—*
Blood, Raymond; Strong, Colin Barry; and Pearson, Alan John, 3,729,955.

Stuart, William R.: *See—*
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Stubits, Marcella C.: *See—*
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Studebaker, Isaac Roger: *See—*
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Sturdy, Clifford; and Hill, Geoffrey Douglas, to Davy and United Engineering Company, Limited. Roller table. 3,730,329, Cl. 198-127.00r.

Suchowski, Bernard, to Sternco Industries, Inc. Three dimensional aquarium background. 3,730,138, Cl. 119-5.000.

Suenaga, Masanobu; Machii, Tetsuo; and Sugioka, Syuji, to Tokyo Shibaura Electric Co., Ltd. Semiconductor switching device. 3,731,162, Cl. 317-235.00r.

Sugahara, Eisuke, to Nippon Piston Ring Co., Ltd. One-piece channel shaped piston ring. 3,729,790, Cl. 29-156.630.

Sugano, Hitoshi: *See—*
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Sugihara, Yasumasa; and Horaguchi, Akira. Colour television receiver. 3,730,981, Cl. 178-5.40p.

Sugimoto, Kaname; Hirao, Mamoru; Yoshida, Mikihiko; Shiosaka, Makoto; and Yokobayashi, Yasuyuki, to Hayashibara Company. Process for preparing low molecular weight amyloses. 3,730,840, Cl. 195-31.00r.

Sugioka, Syuji: *See—*
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Suhr, Volker: *See—*
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Sullivan, Donald N.: *See—*
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Sullivan, John J. Garment-exposing trouser hanger. 3,730,406, Cl. 223-95.000.

Sullivan, William A., Jr., to Xerox Corporation. Control of electrostatic deformation of thermoplastic film. 3,730,621, Cl. 355-9.000.

Sun Chemical Corporation: *See—*
Schloss, Hans R., 3,730,927.

Sunds Aktiebolag: *See—*
Leffler, Nils Gustav, 3,729,961.

Supernaw, Dwight L., to United States of America, Navy. Acoustic torpedo test apparatus. 3,730,121, Cl. 114-20.000.

Supper, Charles, Company: *See—*
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Surrall, Alan John: *See—*
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Suter, Peter: *See—*
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Suzuki, Hidetomo; Arimitsu, Hidenobu; and Tanaka, Shigemasa, to Ebara Infilco Kabushiki Kaisha. Granulating method and apparatus. 3,730,887, Cl. 210-45.000.

Suzuki, Mikio, to NGK Insulators Ltd. Compression filter press provided with expansible and contractible connecting tubes in slurry passages. 3,730,345, Cl. 210-231.000.

Swalley, Everett L.: *See—*
Grady, Guido O.; Swalley, Everett L.; and Swift, Sam C., 3,729,981.

Swander, Kenneth D., Jr., to Certain-Teed Saint Gobain Insulation Corporation. Double diaphragm brake operator improvements. 3,730,056, Cl. 92-48.000.

Swanquist, Wesley W., to All-Steel Equipment Inc. Device for attaching electrical boxes to metal studding. 3,730,466, Cl. 248-216.000.

Swanson, Linwood B., to Cushman Industries, Incorporated. Chuck of high-low operation. 3,730,539, Cl. 279-4.000.

Swanson, Roger I., to Dake Corporation. Apparatus for mounting tension indicators. 3,729,988, Cl. 73-133.000.

Swets, Don E.: *See—*
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SWF-Spezialfabrik fur Autozubehoer Gustav Rau GmbH: *See—*
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Swift & Company: *See—*
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Swift, Harold E.: *See—*
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Swift, Sam C.: *See—*
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System Research Inc.: *See—*
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Szabo, Louis. Boot tree. 3,729,759, Cl. 12-114.400.

Szente-Varga, Hermann Paul, to Aktiengesellschaft Brown, Boveri & Cie. Tubular enclosed 3-phase high voltage line. 3,730,968, Cl. 174-27.000.

Tabata, Kazuki: *See—*
Kusunoki, Sigeru; Murakami, Yoshitsugu; Tashiro, Yutaka; and Tabata, Kazuki, 3,730,245.

Tadini, Costantino: *See—*
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Taguchi, Masahiko: *See—*
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Taiyo Kogyo Company Limited: *See—*
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Takada, Makoto: *See—*
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Takeda Chemical Industries, Ltd.: *See—*
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Takeuchi, Jikko: *See—*
Kono, Yoshinori; Iwasaki, Norio; Sato, Tosho; Mizuno, Masaya; and Takeuchi, Jikko, 3,730,975.

Takigawa, Masuhiko: *See—*
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Takigawa, Shigftsugu; and Takigawa, Masuhiko. Saw manufacture. 3,730,024, Cl. 76-112.000.

Takizawa, Keizo: *See—*

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Talbot, Jack James. Refrigerant charging control unit. 3,729,949, Cl. 62-149.000.

Talens, Bernard R.: *See—*
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Talley, Troy B.: *See—*
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Tamborski, Robert S., to Pullman Incorporated. Door opening mechanism. 3,730,106, Cl. 105-253.000.

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Tanabe Seiyaku Co., Ltd.: *See—*
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Tanaka, Shigemasa: *See—*
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Tani, Kaneyasu; and Kawazoe, Shiro, to Nippon Kakoh Seishi K.K. Apparatus for the production of synthetic paper-like product from a polymer film. 3,730,667, Cl. 425-445.000.

Tannenbaum, Myron: *See—*
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Tannenberger, Helmut; and Charbonnier, Jean-Claude, to Battelle Memorial Institute. Electric accumulator. 3,730,771, Cl. 136-6.000.

Tanner, Robert L.: *See—*
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Tarjanyi, Michael; Strier, Murray P.; and Siegerman, Howard D., to Hooker Chemical Corporation. Decreasing the phenolic content of liquids by an electrochemical technique. 3,730,864, Cl. 204-149.000.

Tarnopolsky, Igor Fafailovich; and Akimtsev, Gennady Vasilievich. Graphics teaching machine. 3,729,837, Cl. 35-9.00r.

Tarrson, Emanuel B. Carton. 3,730,335, Cl. 206-45.310.

Tashiro, Yutaka: *See—*
Kusunoki, Sigeru; Murakami, Yoshitsugu; Tashiro, Yutaka; and Tabata, Kazuki, 3,730,245.

Tawa, Kan, to Yamauchi Rubber Industry Co., Ltd. Apparatus for adjusting the altitude of a chord of an expanding roll. 3,729,788, Cl. 29-116.0ad.

Taylor, Samuel K., to Acme-Cleveland Corporation. Abrasive cleaning. 3,729,871, Cl. 51-17.000.

Tazaki, Kimio; Yamamoto, Hijime; Hinoshita, Shigehiko; and Hagiwara, Shoji, to Nippon Telegraph and Telephone Public Corporation. Multilevel signal transmission system. 3,731,199, Cl. 325-38.00a.

Teagle, Richard E.: *See—*
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Tear Gas Products Corporation: *See—*
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Technicon Instruments Corporation: *See—*
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Technology for Communications International: *See—*
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Telesco Brophey Limited: *See—*
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Television Communications Corporation: *See—*
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Temple, Fred; and Reno, William H., to Westinghouse Air Brake Company. Swivel-type carrier for automatic air hose connector. 3,730,561, Cl. 285-12.000.

Teng, James; Rha, Chokyun; Scallet, Barry L.; and Stubits, Marcella C., to Anheuser-Busch, Incorporated. Hydrocarbons and non-polar solvents gelled with a lipophilic polymeric carbohydrate derivative. 3,730,693, Cl. 44-7.00b.

Tenneco Chemicals, Inc.: *See—*
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Tennis, Francis H., to Hydraulic Industries, Inc. Control valve means for fluid motors. 3,730,219, Cl. 137-596.000.

Terminal Data Corporation: *See—*
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Termohlen, David E.; and Irvine, William G. Curtain wall construction. 3,729,878, Cl. 52-126.000.

Terry, John Brian; and Corlett, David Fleming, to Marconi Company Limited, The. Synchronising arrangements. 3,730,994, Cl. 178-69.5tv.

Terskov, Alexei Danilovich: *See—*
Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Tkach, Khaim Berkovich; Nazarov, Nikolai Grigorievich; Malbert, Petr Eduardovich; Lavron, Nikolai Sergeevich; Alkasarov, Jury Innokentievich; Legeche, Nikolai Leontievich; Golbinshtein, Alexanr Isovich; Reinsburg, Alexandr Mironovich; Burshtein, Mikhail Vladimirovich; Mikushin, Dmitry Pavlovich; Terskov, Alexei Danilovich; and Belov, Leonid Stepanovich, 3,730,283.

Terzian, Leon. Tape applicator. 3,730,815, Cl. 156-527.000.

Teti, John; and Violette, Jerome Carlton, to Du Pont de Nemours, E. I., and Company. Microporous particulate thermoplastic polymer composition. 3,730,918, Cl. 260-2.50m.

Texaco Development Corporation: *See—*
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Texaco Inc.: *See—*
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White, William D.; and Hopkins, Walker L., 3,731,071.

Thakore, Kaushik H., to Bendix Corporation, The. Transistorized ignition system for gas turbine engines. 3,731,143, Cl. 315-209.00t.

Thaxton, Ellis B., to Ride-Rite Corporation. Vehicle air-spring. 3,730,548, Cl. 280-124.00f.

Thaxton, Ellis B., to Ride-Rite Corporation. Air-spring assembly for vehicles. 3,730,550, Cl. 280-124.00f.

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Theiss, Armin: *See—*
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Theobald, Reiner, to Vereinigte Deutsche Metallwerke AG. Method of effecting a pipe coupling. 3,729,791, Cl. 29-157.00r.

Thies, Fred Walter, to Bell Telephone Laboratories, Incorporated. Method and apparatus for reordering data. 3,731,284, Cl. 340-172.500.

Thomas & Betts Corporation: *See—*
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Sinclair, William Young, 3,731,251.

Thomas, Lindsay Maitland, to Fairey Stainless Limited. Manufacture of thin-walled containers. 3,729,812, Cl. 29-471.100.

Thomas, Roy Leander, Jr., to Supper, Charles, Company. Method and apparatus for eliminating spot doubling in precession X-ray crystallography. 3,731,097, Cl. 250-51.500.

Thompson, Palmer B., to United States Gypsum Company. Demountable partition assemblies and the studs therefor. 3,729,883, Cl. 52-481.000.

Thomson-CSF: *See—*
Torguet, Roger, 3,731,231.

Thorn, Frank H.: *See—*
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Thornton, Craig Edward: *See—*
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Thrumond, James A. Foldable, readily-transportable seat. 3,730,294, Cl. 182-20.000.

Thum, Oskar. Spreading bandage for children having dislocated hip bones. 3,730,177, Cl. 128-80.00a.

Thur, Klaus, to Telesco Brophey Limited. Umbrella and sheath. 3,730,199, Cl. 135-20.00r.

Tidwell, Ersey Clinton. Vehicle body tool for twisting doors. 3,729,974, Cl. 72-292.000.

Timken Company, The: *See—*
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Tkach, Khaim Berkovich: *See—*
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Tocquet, Bernard: *See—*
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Todd, Barry S.; and Hueber, Werner G., to United States of America, Navy. Bi-adaptive scan digital universal sensor target tracker. 3,731,104, Cl. 250-203.000.

Toida, Takashi: *See—*
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Tomalia, Donald A.; and Sheetz, David P., to Dow Chemical Company, The. Bi-2-oxazoline and oxazine compounds derived from cyanoethylated poly(ethylene and propylene) glycols. 3,730,915, Cl. 260-2.00n.

Tonka Corporation: *See—*
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Topol, George J.: *See—*
Levin, Gilbert V.; and Topol, George J., 3,730,882.

Torguet, Roger, to Thomson-CSF. Acousto-optical modulator systems. 3,731,231, Cl. 332-7.510.

Torosian, Argist Saakovich. Surge arresters, predominantly for power transmission lines. 3,731,154, Cl. 317-70.000.
Toshiyuki, Mori: *See*—
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Touchette, Jennie Lee: *See*—
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Tran, Trach Lan: *See*—
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Trapasso, Louis E.; and Stackman, Robert W., to Celanese Corporation. Basic dyed polyester fiber modified with a dihydroxyalkoxypropyl or butyl sulfonate. 3,730,681, Cl. 8-168.000.
Trasen, Ben; and Rising, Donald B., to Millipore Corporation. Filter support and filter unit construction. 3,730,353, Cl. 210-455.000.
Tremblay, Theodose, to Lewis, John, Inc. Stick inserter. 3,730,661, Cl. 425-126.000.
Trenczek, Gerhard: *See*—
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Tricot, Roland: *See*—
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Tripp, Terence Gordon, to Monsanto Chemicals Limited. Production of alkoxides. 3,730,857, Cl. 204-59.00r.
Trocme, Claude M., to Eaton Yale & Towne, Inc. Anti-skid brake control and actuator assembly. 3,730,053, Cl. 91-469.000.
Trub, Hannes. Tubular-shaped ozonizer possessing cooled inner electrode. 3,730,874, Cl. 204-321.000.
Trubisky, Leonard G.: *See*—
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True, Thomas T., to General Electric Corporation. Light valve projector with improved image detail and brightness. 3,730,992, Cl. 178-5.4bd.
TRW Inc.: *See*—
Drutchas, Gilbert H.; Clark, Hubert M.; and Melendy, Harold A., 3,730,653.
Van Buren, Harold S., Jr., 3,730,571.
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Tsuji, Akira, to Fuji Photo Film Co., Ltd. Envelope for photosensitive material. 3,730,334, Cl. 206-1.00r.
Tsuji, Nobuo; Ono, Yoshiaki; Nishio, Fumihiko; and Ueda, Hirozo, to Fuji Photo Film Co., Ltd. Color photographic light-sensitive elements. 3,730,726, Cl. 96-84.00r.
Tsukahara, Hirokazu: *See*—
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Tsunoda, Tokorozawa Teruo: *See*—
Oba, Yoichi; Kato, Hachioji; Tsunoda, Tokorozawa Teruo; Fujiki, Yokyo Shun; and Tsukuni, Hitachi Hajime, 3,730,913.
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Uelzmann, Heinz; and Hidinger, David C., Jr., to General Tire & Rubber Company, The. Compositions of epoxy resins and the reaction products of multi-aziridino compounds and hydrogen sulfide. 3,730,945, Cl. 260-47.0en.
Uffner, Melville W., to Air Products and Chemicals, Inc. Dye compositions comprising a fluorocarbon, pigment, bonding agent and dispersant. 3,730,924, Cl. 260-8.000.
Ugine Aciers: *See*—
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Ullmann, Werner; Panschow, Rudolf; Shur, Volker; Meyer, Wolfgang; Sieg, Arno; and Rabian, Laszlo, to Agie, A.G. fur Industrielle Elektronik. Digital circuit for an eroding machine. 3,731,043, Cl. 219-69.00v.
Ullmann, Werner; Rabian, Laszlo; Mattei, Silvano; Sieg, Arno; Suter, Peter; Tadini, Costantino; Panschow, Rudolf; Suhr, Volker; and Meyer, Wolfgang, to Agie, A.G. fur industrielle Elektronik. Electro-eroding machine with a circuit for the control of at leat one device for a wire electrode and/or for a workpiece. 3,731,044, Cl. 219-69.00v.
Ullmann, Werner; Rabian, Laszlo; Mattei, Silvano; Sieg, Arno; Suter, Peter; Tadini, Costantino; Panschow, Rudolf; Suhr, Volker; and Meyer, Wolfgang, to Agie, A.G. fur industrielle Elektronik. Circuit for an electro-eroding machine for the control of the reative movement between at least one electrode and at least one workpiece. 3,731,045, Cl. 219-69.00v.
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National Aeronautics and Space Administration; Administrator; with respect to the invention of:
Dowler, Warren L.; Shafer, John I.; Behm, John W.; and Strand, Leon D. Solid propellant rocket motor. 3,729,935, Cl. 60-256.000.
Hryniewiecki, Edward. Vehicle for use in planetary exploration. 3,730,287, Cl. 180-6.500.

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U.S. Dynamics Inc.: *See—*
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Uzihara, Yuzuru: *See—*
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Van Buren, Harold S., Jr., to TRW Inc. Knob fastener. 3,730,571, Cl. 287-53.00h.

Van Der Aa, Hendrik, to Arlen Mills Inc. Gear box and clutch assembly. 3,730,319, Cl. 192-95.000.

van der Gaag, Cornelis, to N.V. Industrieele Handelscombinatie Holland. Hopper craft. 3,730,402, Cl. 222-561.000.

Van Der Toorn, Lambertus J.; and Voetter, Heinz, to Shell Oil Company. Residual oil hydrodesulfurization process. 3,730,880, Cl. 208-213.000.

Van Dyke, John; and Lamfers, Benard, to Allen, R. C., Inc. Differential demodulator for rate gyro. 3,731,213, Cl. 329-166.000.

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Van Luyn, Robert, to General Electric Company. Leak detector for enclosed electrical apparatus. 3,731,295, Cl. 340-242.000.

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Vance, Alvin M. F., to Westinghouse Electric Corporation. System for regenerative load absorption. 3,730,573, Cl. 290-17.000.

Vandebeek, Willard F., to Olin Corporation. Lantern. 3,731,078, Cl. 240-11.000.

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Vass, Leslie, to Hubbell, Harvey, Incorporated. Monitoring system. 3,731,294, Cl. 340-213.00r.

Vawter, Verne E.; and Fernandez, Richard E., to Rohr Industries, Inc. Nut plate riveting device. 3,729,809, Cl. 29-243.530.

Veale, John R., to Xerox Corporation. Multiplying circuit with pulse duration control means. 3,731,206, Cl. 328-58.000.

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Ventriglio, Frank J.; Zall, David M.; Stockhausen, Cyril J.; and Decker, Donald R., Jr. Carbon dioxide sorbent for confined breathing atmospheres. 3,729,902, Cl. 55-389.000.

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Walch, Leon E. Trailer water filling system. 3,730,212, Cl. 137-355.120.
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Wohlbach, Harry E., to Electro Mechanical Instrument Company, Inc. Magnetic latching indicator. 3,731,303, Cl. 340-373.00r.
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Zimmerer, Arthur L.; Zimmerer, Bernard J.; and Zimmerer, Paul B., to Lindsay Manufacturing Co. Towable drive tower for center pivot irrigation systems. 3,730,435, Cl. 239-213.000.

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LIST OF DEFENSIVE PUBLICATIONS

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Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Blount, William W., Jr. Electroplatable Polypropylene or polyallomer composition. T910,001, 5–1–73, Cl. 260—23.

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Hodges, Wilbur C.: *See*—
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Hotter, Lynn R. Photographic bleach compositions. T910,002, 5–1–73, Cl. 96—60.

Klug, Eugene D., to Hercules Inc. Paint remover compositions. T910,003, 5–1–73, Cl. 252—717.

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Berney, Joseph C. Foldable case setup apparatus. Re. 27,631, 5–1–73, Cl. 93—53.

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4.5R 3,730,062
10CT 3,730,063
10C 3,730,064
13 3,730,065
31R 3,730,066
44C 3,730,067
44R 3,730,068
98 3,730,069

CLASS 96

1SD 3,730,707
1R 3,730,710
1.2 3,730,708
1.4 3,730,709
1.5 3,730,711
3,730,712
1.7 3,730,714
3 3,730,713
27R 3,730,717
29D 3,730,718
29R 3,730,716
35.1 3,730,715
36.1 3,730,719
38.3 3,730,720
48PD 3,730,721
56.3 3,730,722
64 3,730,723
74 3,730,724
81 3,730,725
84R 3,730,726
95 3,730,727
115R 3,730,734

CLASS 98

2.04 3,730,070
40D 3,730,071
3,730,072
60 3,730,073
121 3,730,074

CLASS 99

3 3,730,728
26 3,730,729
50.5 3,730,730
68 3,730,731
80R 3,730,732
100 3,730,733
134R 3,730,735
141A 3,730,736
171B 3,730,737
174 3,730,738
3,730,739
187 3,730,740
194 3,730,741
233.11 3,730,742
310 3,730,075
347 3,730,076

CLASS 100

48 3,730,078
121 3,730,079

CLASS 101

23 3,730,080
25 3,730,081
93MN 3,730,083
93C 3,730,082
109 3,730,084
110 3,730,085
148 3,730,086
169 3,730,087
269 3,730,088
363 3,730,089
365 3,730,090
415.1 3,730,092
471 3,730,091

CLASS 102

6 3,730,093
27R 3,730,096
3,730,097
34.4 3,730,098
35.6 3,730,099
38 3,730,094
42C 3,730,095
70S 3,730,100
79 3,730,101

CLASS 104

48 3,730,102

CLASS 105

141 3,730,103

199CB 3,730,104
215C 3,730,105
253 3,730,106

CLASS 106

1 3,730,743
57 3,730,744
110 3,730,745
287SE 3,730,746
288B 3,730,747
3,730,748
3,730,749
309 3,730,750

CLASS 108

39 3,730,107
43 3,730,077
108 3,730,108
156 3,730,109

CLASS 109

25 3,730,110
29 3,730,111

CLASS 110

8R 3,730,112
18R 3,730,113
3,730,114

CLASS 112

79R 3,730,115
121.15 3,730,116
212 3,730,117

CLASS 113

30 3,730,118

CLASS 114

.5R 3,730,119
3,730,120
20 3,730,121
53 3,730,122
66.5H 3,730,123
106 3,730,124
109 3,730,125
144B 3,730,126
145A 3,730,127
201 3,730,128
218 3,730,129

CLASS 115

18R 3,730,130
41HT Re.27,633

CLASS 116

120 3,730,131
133 3,730,132

CLASS 117

11 3,730,751
3,730,752
34 3,730,753
36.2 3,730,754
3,730,755
47A 3,730,757
47R 3,730,756
51 3,730,758
72 3,730,759
101 3,730,760
104R 3,730,763
131 3,730,761
139.5CQ 3,730,762
201 3,730,764
212 3,730,765
217 3,730,766
239 3,730,767

CLASS 118

2 3,730,133
6 3,730,134
16 3,730,135
78 3,730,136
325 3,730,137

CLASS 119

5 3,730,138
23 3,730,139
28 3,730,140
51.5 3,730,141
54 3,730,142
130 3,730,143

CLASS 122

13A 3,730,144

CLASS 123

8.41 3,730,145
32EA 3,730,146
41.12 3,730,151
41.44 3,730,147
43R 3,730,148
44R 3,730,152
73R 3,730,149
90.18 3,730,150
103R 3,730,153
117A 3,730,154
119A 3,730,156
119R 3,730,155
3,730,157
136 3,730,158
3,730,159
142 3,730,160
185BA 3,730,162
190D 3,730,161
193P 3,730,163

CLASS 126

266 3,730,165
350R 3,730,166
386 3,730,167

CLASS 127

19 3,730,768
3,730,769
46B 3,730,770

CLASS 128

2F 3,730,168
3,730,170
2S 3,730,169
2.05F 3,730,171
2.05M 3,730,172
2.08 3,730,173
6 3,730,175
25R 3,730,174
66 3,730,176
80A 3,730,177
94 3,730,164
142.5 3,730,178
145.5 3,730,179
145.6 3,730,180
152 3,730,181
173 3,730,182
213 3,730,183
287 3,730,184
303 3,730,185
303.14 3,730,188
325 3,730,186
349R 3,730,187

CLASS 131

17R 3,730,189

CLASS 132

11 3,730,190
73.6 3,730,191

CLASS 134

2 3,730,192
10 3,730,193
41 3,730,194
138 3,730,195

CLASS 135

5A 3,730,196
16 3,730,197
20R 3,730,199
50 3,730,198

CLASS 136

6 3,730,771
30 3,730,772
83R 3,730,775
86R 3,730,774
100R 3,730,776
131 3,730,777

CLASS 137

1 3,730,200
13 3,730,201
3,730,202
14 3,730,203
68 3,730,204
73 3,730,205
87 3,730,206
106 3,730,207
119 3,730,208
217 3,730,209
329.1 3,730,210
344 3,730,211
355.12 3,730,212
364 3,730,213
487 3,730,214
494 3,730,215
512.4 3,730,217
525 3,730,218
588 3,730,216
596 3,730,219
596.2 3,730,220
614 3,730,221
614.05 Re.27,635
625.17 3,730,222
625.23 3,730,223
625.33 3,730,224
625.48 3,730,225
627.5 3,730,226

CLASS 138

40 3,730,227
46 3,730,773
106 3,730,228
114 3,730,229

CLASS 139

24 3,730,230
66 3,730,231
3,730,232
309 3,730,233

CLASS 140

147 3,730,234

CLASS 141

172 3,730,235

CLASS 144

27 3,730,236

CLASS 145

52 3,730,237
76 3,730,238

CLASS 148

1.5 3,730,778
6.3 3,730,783
6.35 3,730,779
9 3,730,780
11.5R 3,730,781
23 3,730,782
101 3,730,784
142 3,730,785
175 3,730,786
3,730,787

CLASS 149

1 3,730,788
19 3,730,792
22 3,730,789
3,730,793
44 3,730,790
46 3,730,791

CLASS 150

2.5 3,730,240
52A 3,730,241

CLASS 151

41.5 3,730,243
41.7 3,730,242

CLASS 152

323 3,730,244
352 3,730,245
356 3,730,246
367 3,730,247
379 3,730,248

CLASS 156

5 3,730,799
8 3,730,800
96 3,730,801
98 3,730,802
112 3,730,794
169 3,730,795
173 3,730,796
182 3,730,797
201 3,730,798
205 3,730,803
272 3,730,804
3,730,805
3,730,806
331 3,730,807
332 3,730,808
345 3,730,809
353 3,730,810
367 3,730,811
380 3,730,812
441 3,730,813
515 3,730,814
527 3,730,815
559 3,730,816
580 3,730,817

CLASS 160

126 3,730,249

CLASS 161

17 3,730,818
26 3,730,819
38 3,730,820
57 3,730,821
66 3,730,822
82 3,730,823
142 3,730,824
148 3,730,825
193 3,730,826
3,730,827
258 3,730,828

CLASS 162

146 3,730,830
175 3,730,829
321 3,730,831

CLASS 164

22 3,730,250
82 3,730,251
134 3,730,252
241 3,730,253
268 3,730,254
274 3,730,255
282 3,730,256
283 3,730,257
3,730,258

CLASS 165

5 3,730,259
27 3,730,260
39 3,730,261
46 3,730,262
86 3,730,263
128 3,730,264
134 3,730,265
186 3,730,266

CLASS 166

.5 3,730,267
177 3,730,268
3,730,269
247 3,730,270
269 3,730,273
294 3,730,271
3,730,272
299 3,730,274
308 3,730,275
314 3,730,276

CLASS 169

2R 3,730,278

CLASS 172

212 3,730,279
581 3,730,280

CLASS 173

48 3,730,281

CLASS 174

13 3,730,965
15C 3,730,966
3,730,967
27 3,730,968
52S 3,730,969
68B 3,730,971
73R 3,730,970
94R 3,730,972

CLASS 175

4.51 3,730,282
53 3,730,283
92 3,730,284
220 3,730,285
320 3,730,286

CLASS 176

30 3,730,832
37 3,730,833
45 3,730,834

CLASS 178

2R 3,730,973
3 3,730,974
5.1 3,730,980
5.2R 3,730,975
5.4BD 3,730,992
5.4CD 3,730,976
3,730,983
5.4CK 3,730,978
3,730,982
5.4ST 3,730,977
5.4P 3,730,981
5.4R 3,730,979
5.6 3,730,986
6 3,730,984
6.8 3,730,277
3,730,985
3,730,988
7.1 3,730,987
7.5R 3,730,989
3,730,991
7.8 3,730,990
59 3,730,993
69.5TV 3,730,994

CLASS 179

1HS 3,730,996
1VC 3,730,995
6 3,730,997
8R 3,731,000
15AL 3,731,002
15BS 3,730,998
18FH 3,731,001
27FF 3,731,003
84R 3,730,999
84T 3,731,004
100.2CH 3,731,007
100.2MD 3,731,006
100.2C 3,731,005
100.2S 3,731,008
100.41K 3,731,009
167 3,731,010
175.3 3,731,012
175.31R 3,731,011

CLASS 180

6.5 3,730,287
79.2R 3,730,288
126 3,730,298

CLASS 181

.5NC 3,730,289
24 3,730,290
31B 3,730,291
33HC 3,730,292
36B 3,730,293

CLASS 182

20 3,730,294
163 3,730,295

CLASS 184

6.4 3,730,297

CLASS 187

29R 3,730,299

CLASS 188

5 3,730,300
71.6 3,730,301
73.5 3,730,302
170 3,730,303
218XL 3,730,304
322 3,730,305
345 3,730,306
352 3,730,307

CLASS 190

41R 3,730,308
49 3,730,309

CLASS 191

29DM 3,730,310
49 3,730,311
66 3,730,312

CLASS 192

3.3 3,730,315
12C 3,730,313
18A 3,730,314
41A 3,730,316
84R 3,730,317
95 3,730,319
99S 3,730,318
107M 3,730,320
134 3,730,296

CLASS 194

9T 3,730,321

CLASS 195

1.7 3,730,835
28N 3,730,836
28R 3,730,837
29 3,730,838
3,730,839
31R 3,730,840
63 3,730,841
103.5R 3,730,842
3,730,843
3,730,844
129 3,730,845
3,730,846

CLASS 197

36 3,730,322
82 3,730,323

CLASS 198

24 3,730,324
33AD 3,730,326
33R 3,730,325
37 3,730,327
44 3,730,328
127R 3,730,329
3,730,330
189 3,730,331
213 3,730,332
219 3,730,333

CLASS 200

4 3,731,013
5A 3,731,014
3,731,015
11D 3,731,017
11R 3,731,016
34 3,731,021
48R 3,731,018
61.45R 3,731,019
3,731,020
61.49 3,731,022
78 3,731,023
80R 3,731,024
81.9R 3,731,025
144B 3,731,026
150R 3,731,029
157 3,731,027
159R 3,731,030
164R 3,731,032
167A 3,731,028
172R 3,731,031

CLASS 202

103 3,730,849
139 3,730,847
173 3,730,848

CLASS 203

52 3,730,850

CLASS 204

1.5 3,730,851
38B 3,730,852
43 3,730,853
49 3,730,854
55R 3,730,855
56R 3,730,856
59R 3,730,857
3,730,858
67 3,730,859
108 3,730,860
129.75 3,730,861
149 3,730,864
163R 3,730,862
164 3,730,863
181 3,730,865
3,730,866
192 3,730,867
195C 3,730,869
195P 3,730,868
224 3,730,870
245 3,730,871
252 3,730,872
298 3,730,873
321 3,730,874

CLASS 206

1R 3,730,334
45.31 3,730,335
47B 3,730,336
3,730,337
63.2R 3,730,338
65V 3,730,340
84 3,730,339

CLASS 208

57 3,730,875
59 3,730,876
143 3,730,877
3,730,878
210 3,730,879
213 3,730,880

CLASS 209

122 3,730,342
164 3,730,341

CLASS 210

6 3,730,881
3,730,882
7 3,730,883
15 3,730,884
30 3,730,885
37 3,730,886
45 3,730,887
52 3,730,888
68 3,730,343
152 3,730,344
231 3,730,345
242 3,730,346
266 3,730,347
274 3,730,348
281 3,730,349
321 3,730,350
3,730,351
332 3,730,352
455 3,730,353

CLASS 211

38 3,730,354
59 3,730,355

CLASS 214

1BC 3,730,356
6DK 3,730,357
16.4A 3,730,358
38D 3,730,359
63 3,730,360
85 3,730,361
140 3,730,362
302 3,730,364
3,730,365
512 3,730,366
518 3,730,367
653 3,730,368
674 3,730,369

CLASS 215

9 3,730,370
3,730,371
32 3,730,372

CLASS 219

7.5 3,731,033
10.49 3,731,034
10.55 3,731,035
3,731,036
3,731,037
3,731,038
10.79 3,731,040
56 3,731,042
62 3,731,041
69V 3,731,043
3,731,044
3,731,045
78 3,731,046
121EB 3,731,052
121P 3,731,047
130 3,731,048
131F 3,731,049
149 3,731,050
162 3,731,051
202 3,731,053
243 3,731,054
349 3,731,055
361 3,731,056
363 3,731,057
407 3,731,039
523 3,731,058
535 3,730,373

CLASS 220

9LG 3,730,375
9F 3,730,374
27 3,730,376
3,730,377
29 3,730,378
48 3,730,379
54 3,730,380
3,730,381
60R 3,730,382
66 3,730,383
71 3,730,384
97C 3,730,385

CLASS 221

7 3,730,386
68 3,730,388
265 3,730,387

CLASS 222

31 3,730,389
79 3,730,390
82 3,730,391
3,730,392
106 3,730,393
137 3,730,394
145 3,730,395
166 3,730,396
254 3,730,397

309 3,730,398
482 3,730,399
497 3,730,400
512 3,730,401
561 3,730,402
572 3,730,403

CLASS 223

38 3,730,404
72 3,730,405
95 3,730,406

CLASS 224

9 3,730,407

CLASS 225

2 3,730,408
14 3,730,409
96.5 3,730,410
100 3,730,411
103 3,730,412

CLASS 226

97 3,730,413

CLASS 227

8 Re.27,628
130 3,730,414

CLASS 228

3 3,730,415

CLASS 229

16A 3,730,416
23R 3,730,417
27R 3,730,418
28 3,730,419
44R 3,730,420
66R 3,730,421

CLASS 233

16 3,730,422
38 3,730,423

CLASS 234

130 3,730,424

CLASS 235

61A 3,731,059
61.11D 3,731,061
3,731,085
61.11E 3,731,062
3,731,063
3,731,064
61.12N 3,731,065
61.7B 3,731,076
61.7R 3,731,060
92CN 3,731,066
92FQ 3,731,067
101 3,731,068
151.12 3,731,071
151.3 3,731,069
3,731,070
3,731,072
152 3,731,073
155 3,731,074
164 3,730,425
181 3,731,075

CLASS 236

44C 3,730,426
46 3,730,427
87 3,730,428
94 3,730,429
101 3,730,430

CLASS 237

2 Re.27,632

CLASS 239

1 3,730,431
2R 3,730,432
15 3,730,433
47 3,730,434
213 3,730,435
265.39 3,730,436
306 3,730,437
490 3,730,438
590.3 3,730,439
590.5 3,730,440

CLASS 240

1EL 3,731,077
6.4W 3,731,084
7.1H 3,731,079
9.5 3,731,080
10R 3,731,081
10.5 3,731,082
10.65 3,731,083
11 3,731,078

CLASS 241

23 3,730,445
60 3,730,441
3,730,442
82.1 3,730,443
82.5 3,730,444
110 3,730,446
282.1 3,730,363

CLASS 242

18PW 3,730,447
43.1 3,730,448
57.1 3,730,449
66 3,730,450
68 3,730,451
68.4 3,730,452
84.1L 3,730,455
191 3,730,453
192 3,730,454

CLASS 244

1SA 3,730,457
12B 3,730,456
43 3,730,458
48 3,730,459
53R 3,730,460
77E 3,730,461

CLASS 246

63C 3,731,086
169D 3,731,087
182B 3,731,088

CLASS 248

10 3,730,462
22 3,730,463
57 3,730,464
188.6 3,730,465
216 3,730,466
243 3,730,467
3,730,477
246 3,730,468
265 3,730,469
274 3,730,470
3,730,471
300 3,730,472
358R 3,730,473
478 3,730,474

CLASS 249

13 3,730,475
191 3,730,476

CLASS 250

41.9SB 3,731,089
43 3,731,090
43.5R 3,731,091
3,731,092
44 3,731,093
49.5AE 3,731,096
49.5A 3,731,095
49.5D 3,731,094
51.5 3,731,097
83.3H 3,731,098
3,731,099
83.6FT 3,731,100
108R 3,731,101
3,731,102
199 3,731,103
203 3,731,104
217R 3,731,105
231SE 3,731,107
236R 3,731,106

CLASS 251

8 3,730,478
121 3,730,479

CLASS 252

7 3,730,890
8.1 3,730,891
8.5C 3,730,900
8.75 3,730,892
12.4 3,730,893
16 3,730,894
18 3,730,895
28 3,730,896
57 3,730,485
78 3,730,889
3,730,897
3,730,898
87 3,730,901
99 3,730,902
156 3,730,903
171 3,730,904
316 3,730,905
342 3,730,906
358 3,730,907
426 3,730,908
434 3,730,909
455Z 3,730,910
516 3,730,911
528 3,730,912
541 3,730,913

CLASS 254

71 3,730,480
93R 3,730,481
124 3,730,482
150 3,730,483
167 3,730,484

CLASS 256

14 3,730,899

CLASS 259

6 3,730,486
3,730,487
67 3,730,488
72 3,730,489
108 3,730,490
109 3,730,491
193 3,730,492

CLASS 260

2A 3,730,922
2N 3,730,915
2S 3,730,914
2.5AK 3,730,917
2.5AQ 3,730,923
2.5AZ 3,730,919
2.5B 3,730,920
2.5M 3,730,918
2.5N 3,730,916
2.5P 3,730,921
3,730,931
8 3,730,924
17.4ST 3,730,925
18EP 3,730,926
23EP 3,730,930
23H 3,730,929
29.1SB 3,730,932
29.2TN 3,730,927
29.6WB 3,730,933
29.7R 3,730,928
31.6 3,730,934
33.4EP 3,730,935
37SB 3,730,938
37N 3,730,936
3,730,939
37R 3,730,937
41A 3,730,940
3,730,942
45.75R 3,730,943
47CP 3,730,941
47EC 3,730,948
47EN 3,730,945
47ET 3,730,944
47UA 3,730,947
47R 3,730,946
3,730,949
77.5AM 3,730,953
77.5AQ 3,730,950
77.5B 3,730,951
78A 3,730,952
248.5 3,730,954
256.4Q 3,730,955
286R 3,730,956
308B Re.27,629
673 3,730,957
683.2 3,730,958

CLASS 261

4 3,730,493
21 3,730,494
23A 3,730,496
24 3,730,497
34A 3,730,495
39B 3,730,498
109 3,730,499
140 3,730,500

CLASS 264

263 3,730,959

CLASS 266

4A 3,730,501
5R 3,730,502
20 3,730,503
23H 3,730,504
34L 3,730,505
39 3,730,506
3,730,507

CLASS 267

52 3,730,508
152 3,730,509

CLASS 269

25 3,730,510
152 3,730,511

CLASS 271

9 3,730,513
11 3,730,514
46 3,730,515
62R 3,730,516
76 3,730,517

CLASS 272

1R 3,730,518
3,730,520
57A 3,730,521
60 3,730,522
67 3,730,523

CLASS 273

1R 3,730,519
85R 3,730,524
89 3,730,525
95A 3,730,526
131KN 3,730,527
134AD 3,730,528
186A 3,730,529
3,730,530
191A 3,730,531

CLASS 274

4B 3,730,534
3,730,535
4F 3,730,533
4G 3,730,532
23R 3,730,536

CLASS 277

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	311	226,792		235	226,799		275	226,806		15	226,813		27	226,819	D66—		226,825
D 6—	20	226,793			226,800	D14—	3	226,807			226,814		31	226,820	D71—		226,826
	66	226,794			226,801		6	226,808	D44—	1	226,815	D49—	6	226,821			226,827
	201	226,795	D 9—	71	226,802			226,809			226,816		17	226,822	D83—		226,828
	234	226,796		139	226,803	D22—	13	226,810		10	226,817	D55—	1	226,823		12	226,829
	235	226,797		186	226,804	D26—	14	226,811			226,830						

DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

96—	27R	T910,005		60	T910,002		87R	T910,004	252—	717	T910,003	260—	23H	T910,001	

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PATENTS

1	:	3,729,998		3,730,131		3,730,735	8	:	3,729,752		3,731,023		3,729,862
		3,730,105		3,730,134		3,730,760			3,729,900		3,731,057		3,730,361
2	:	3,729,879		3,730,141		3,730,776			3,730,064		3,731,064		3,730,444
4	:	3,729,901		3,730,145		3,730,788			3,730,225		3,731,065		3,730,471
		3,729,909		3,730,150		3,730,792			3,730,268		3,731,068		3,730,622
		3,729,948		3,730,160		3,730,793			3,730,270		3,731,070		3,730,741
		3,729,990		3,730,172		3,730,815			3,730,337		3,731,107		3,730,937
		3,730,127		3,730,181		3,730,835			3,730,580		3,731,163		3,731,295
		3,730,132		3,730,182		3,730,842			3,730,603		3,731,205	16	: 3,730,174
		3,730,234		3,730,186		3,730,889			3,730,772		3,731,218		3,730,187
		3,730,425		3,730,191		3,730,891			3,730,791		3,731,253		3,730,556
		3,730,890		3,730,194		3,730,893			3,730,849		3,731,261		3,730,559
		3,731,181		3,730,203		3,730,897			3,731,001		3,731,293		3,730,592
5	:	3,730,590		3,730,208		3,730,898			3,731,176		3,731,294		3,730,763
6	:	Re.27,630		3,730,214		3,730,909			3,731,208	10	: 3,730,490		3,731,274
		Re.27,631		3,730,223		3,730,922			3,731,289		3,730,685	17	: 3,729,744
		3,729,757		3,730,224		3,730,947	9	:	3,729,747		3,730,717		3,729,745
		3,729,774		3,730,247		3,730,985			3,729,797		3,730,918		3,729,770
		3,729,775		3,730,267		3,731,010			3,729,848		3,731,101		3,729,771
		3,729,778		3,730,273		3,731,020			3,729,860		3,731,102		3,729,772
		3,729,796		3,730,277		3,731,026			3,729,977	11	: 3,729,829		3,729,782
		3,729,801		3,730,287		3,731,051			3,729,980		3,730,120		3,729,804
		3,729,802		3,730,292		3,731,059			3,730,006		3,730,543		3,729,836
		3,729,809		3,730,311		3,731,061			3,730,015		3,730,789		3,729,845
		3,729,817		3,730,352		3,731,062			3,730,052	12	: 3,729,751		3,729,847
		3,729,850		3,730,358		3,731,075			3,730,077		3,729,768		3,729,881
		3,729,856		3,730,387		3,731,090			3,730,084		3,729,855		3,729,882
		3,729,859		3,730,391		3,731,098			3,730,112		3,729,906		3,729,885
		3,729,868		3,730,394		3,731,099			3,730,193		3,730,122		3,729,894
		3,729,870		3,730,399		3,731,103			3,730,229		3,730,139		3,729,897
		3,729,874		3,730,431		3,731,104			3,730,322		3,730,171		3,729,911
		3,729,878		3,730,432		3,731,106			3,730,392		3,730,179		3,729,922
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		3,729,884		3,730,443		3,731,133			3,730,434		3,730,195		3,729,959
		3,729,899		3,730,457		3,731,146			3,730,499		3,730,198		3,730,005
		3,729,935		3,730,459		3,731,165			3,730,531		3,730,371		3,730,010
		3,729,951		3,730,470		3,731,196			3,730,539		3,730,429		3,730,016
		3,729,965		3,730,483		3,731,209			3,730,552		3,730,436		3,730,018
		3,729,987		3,730,496		3,731,221			3,730,555		3,730,469		3,730,029
		3,730,002		3,730,553		3,731,233			3,730,576		3,730,512		3,730,043
		3,730,013		3,730,560		3,731,238			3,730,600		3,730,628		3,730,075
		3,730,019		3,730,563		3,731,255			3,730,634		3,730,650		3,730,076
		3,730,046		3,730,564		3,731,264			3,730,640		3,730,662		3,730,087
		3,730,050		3,730,567		3,731,273			3,730,664		3,730,980		3,730,090
		3,730,081		3,730,572		3,731,276			3,730,732		3,731,174		3,730,104
		3,730,091		3,730,578		3,731,283			3,730,779		3,731,200		3,730,148
		3,730,093		3,730,612		3,731,291			3,730,841		3,731,306		3,730,149
		3,730,108		3,730,613		3,731,292			3,730,848		3,731,307		3,730,157
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3,730,094	3,730,561	3,731,121	3,730,689	3,730,746	3,730,884
3,730,130	3,730,565	3,731,135	3,730,888	3,730,799	3,730,892
3,730,140	3,730,586	3,731,142	48 : 3,729,773	3,730,828	3,731,201
3,730,180	3,730,611	3,731,150	3,729,851	3,730,869	52 : 3,730,310
3,730,204	3,730,666	3,731,164	3,729,940	3,730,876	53 : 3,729,760
3,730,256	3,730,669	3,731,185	3,729,941	3,730,900	3,729,985
3,730,257	3,730,673	3,731,193	3,729,962	3,730,914	3,730,054
3,730,258	3,730,697	3,731,254	3,729,986	3,731,054	3,730,346
3,730,261	3,730,706	3,731,277	3,729,991	3,731,071	3,730,476
3,730,262	3,730,720	3,731,285	3,730,008	3,731,082	3,730,520
3,730,263	3,730,758	3,731,303	3,730,078	3,731,119	3,730,558
3,730,278	3,730,785	3,731,312	3,730,173	3,731,172	3,730,728
3,730,289	3,730,808	43 : 3,729,852	3,730,228	3,731,188	3,730,730
3,730,295	3,730,813	44 : 3,729,854	3,730,236	3,731,269	3,731,100
3,730,326	3,730,819	3,730,233	3,730,269	3,731,270	3,731,149
3,730,342	3,730,823	3,730,290	3,730,272	3,731,297	55 : 3,729,886
3,730,362	3,730,879	3,730,759	3,730,284	49 : 3,729,765	3,729,907
3,730,369	3,730,916	45 : 3,729,822	3,730,286	3,730,017	3,730,164
3,730,373	3,730,921	3,729,910	3,730,313	3,730,069	3,730,219
3,730,378	3,730,924	3,729,958	3,730,321	3,730,165	3,730,250
3,730,383	3,730,933	3,730,129	3,730,367	3,731,243	3,730,317
3,730,401	3,730,941	3,730,230	3,730,396	3,731,318	3,730,400
3,730,408	3,730,957	47 : 3,729,835	3,730,537	51 : 3,730,001	3,730,497
3,730,418	3,730,971	3,729,974	3,730,548	3,730,080	3,730,738
3,730,441	3,731,018	3,730,047	3,730,550	3,730,201	3,730,739
3,730,474	3,731,022	3,730,115	3,730,570	3,730,406	3,730,805
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					3,731,112

DESIGN PATENTS

1 : 226,802	226,829	226,809	226,805	37 : 226,792	226,800
6 : 226,796	17 : 226,794	26 : 226,817	226,814	39 : 226,820	226,801
226,811	226,808	27 : 226,828	226,816	40 : 226,803	226,830
226,819	226,822	29 : 226,810	226,818	42 : 226,795	48 : 226,826
226,825	25 : 226,797	34 : 226,798	226,823	44 : 226,806	51 : 226,813
8 : 226,815	226,804	36 : 226,793	226,827	47 : 226,799	55 : 226,791
12 : 226,824					

DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

10 : T910,003	27 : T910,004	36 : T910,002	T910,005	47 : T910,001

U. S. GOVERNMENT PRINTING OFFICE : O - 1973

U.S. DEPARTMENT OF COMMERCE
Frederick B. Dent, Secretary
PATENT OFFICE
Robert Gottschalk, Commissioner